INDUSTRIAL REFRIGERATION

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VOLUME 131
NUMBER 2

AUGUST, 1956

Jenni Genetron says:

Buy from your genetron wholesaler displaying this clock!

IT'S ALWAYS THE RIGHT TIME FOR genetron® Super-Dry Refrigerants

genetron 11 ORANGE LABEL
TRICHLOROMONOFLUOROMETHANE

genetron 12 WHITE LABEL
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genetron 141 GREEN LABEL
MONOCHLORODIFLUOROMETHANE

genetron 226 PURPLE LABEL
TRICHLOROTRIFLUOROETHANE

genetron 320 DARK BLUE LABEL
DICHLOROTETRAFLUOROETHANE

Wherever you are—from coast to coast—there's a "genetron" wholesaler as close to you as your telephone. When you order refrigerants, always ask for "genetron" super-dry refrigerants!

Basic Chemicals for American Industry

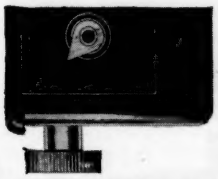
GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

GC
Allied Chemical

ELECTRIC Heating Cable DEFROSTERS

for LOW TEMPERATURE DOORS

1 • Temperature adjustment control.



2 • Adjustable thermostat for range of +85° to +245° F.

3 • Steel electrical outlet box for making connection between heating element and thermostat—inlet for power.

4 • Rabbeted channels into casing.

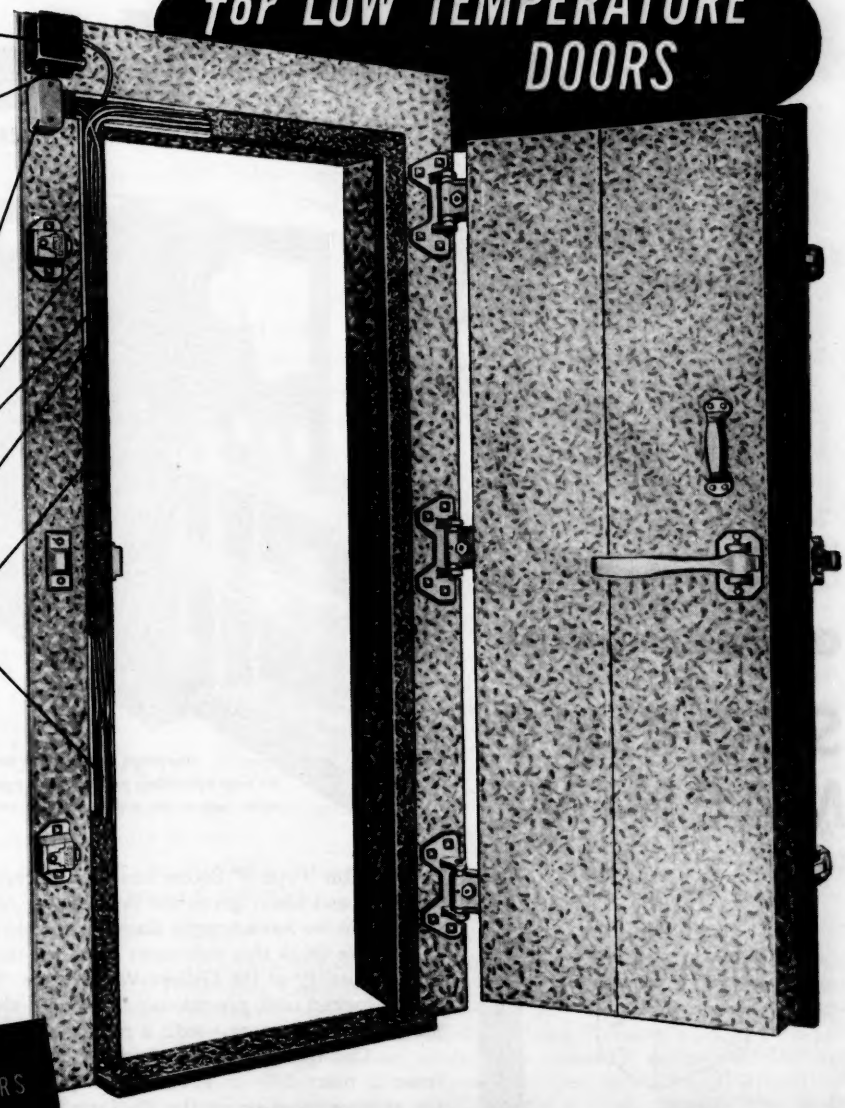
5 • Fireproof No. 26 gauge galvanized metal lined inside channel.

6 • Lead covered "heater cables" (4) held down securely by clips —approximately 20 watts to a foot. (110 volts — 60 cycles).

7 • No. 10 gauge galvanized steel cover plates—removable.

8 • Capillary tube controls (on and off) thermostat.

The purpose of heating cables is to prevent icing conditions at the frame and sill areas where the door gaskets make their contact. The cables which are recessed into the frame casing are electrically heated and controlled by a "calibrated thermostat" (new improved feature by Butcher Boy), adjustable above the "dew point" of the air temperature. Since the heat expended prevents condensation it thus prevents freezing conditions.



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QUALITY SINCE 1885

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Tops in ice scoring...

For small and medium tonnage plants the Type "F" unit shown fits most operations perfectly with maximum safety and economy. No installation cost as pit and foundation are not needed.

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A complete line of top-quality hand-tools . . . tongs, hooks, shavers, bars, chisels, etc. . . . designed to make manual handling of ice easy and safe—made tough to stand the gaff of years. Write for Bulletin No. 480.

"Our Type 'F' Scorer has been in constant use for nearly 14 years and has...given the best service of any piece of equipment we have bought since we started in business in 1906."

We think this statement from one user speaks volumes for the quality of the Gifford-Wood Type "F" Scoring Machine. It is a rugged unit, precision-built to do a clean, even scoring job over many years—with a minimum of maintenance.

One-man operation of a G-W Type "F" Scorer delivers three or more 300- or 400-lb. cakes per minute—either in the storage room or on the platform. Completely portable, no hold-down bolts needed.

For full information on other types of ice scorers manufactured by Gifford-Wood, write for Bulletin 116A.

GIFFORD-WOOD CO.

NEW YORK 17 — *Since 1814* — CHICAGO 6

420 Lexington Avenue — HUDSON, N. Y. — 565 W. Washington St.

Pacific Coast Representative: Western Ice Equipment Company, 420 Market St., San Francisco 11

Cuber — Breaker-Elevator — Conveyor — Breaker

STAND-OUT

Ice Warms Mine in Winter And Cools it in Summer

A UNIQUE air conditioning system that raises the temperature of cold air in the winter by making ice and uses the ice to reduce the temperature in the summer has been put into service at the Stobie section of the International Nickel Company's Frood-Stobie Mine in the Sudbury District of Ontario, Canada. When the thermometer goes below zero during Northern Ontario's frigid winters, ice production is stepped up to take the chill off the fresh air supplied from the surface to the mine workings. Basis of this unusual system is a convenient twist of nature whereby heat is released when ice is formed.

The fan that delivers the air to underground has a diameter of 198 inches and is one of the largest in the world. This powerful fan, which has a top capacity of 750,000 cubic feet per minute, blows fresh air from the surface through a 300-foot vertical airway 20 feet in diameter into two huge open stopes mined by the blasthole method for this purpose between the 300 and 500-foot elevations. Each stope is 80 feet wide, 200 feet long and 200 feet high, and the stopes are separated by a pillar 70 feet wide. The air circulates through the two stopes in succession on its way to the main intake.

Water from the mine's main pumping system is furnished at 120 pounds pressure to the four spray points at the top of each stope. The volume of water required in winter months varies up to 200 gallons per minute. The fine particles of water sprayed into the air passing through the stopes turn to ice, and the heat given up in the process is transferred to the air. Some 40,000 tons of ice were formed at the bottom of the stopes during the past winter. This heat, along with that absorbed by the air from the large area of wall rock exposed in the stopes, added up to 15,000,000,000 British thermal units, or the equivalent of burning 100,000 gallons of oil or 850 tons of coal.

Although the surface temperature during the winter ranges to 25 degrees below zero, the fresh air delivered from the main intake of the mine ventilation system 600 feet below surface varied only between 27 and 30 degrees above zero as a result of its side trip through the ice stopes. The temperature eventually is ex-

(Continued on page 58)

Industrial Refrigeration

formerly **ICE AND REFRIGERATION**
Now in its 65th Year of Publication
J. F. NICKERSON, FOUNDER

Vol. 131 **August, 1956** **Number 2**

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The Cover:

Refrigeration compressors at Humboldt office of the Illinois Bell Telephone Company is being examined by Field Engineer John Dimfl. To match the cooling effect of this compressor, 250 window air conditioners would be needed. Air conditioning also is used for humidity and temperature control in sensitive automatic dial apparatus rooms and for the automatic billing machines. But comfort cooling runs all the other applications a close second. See story starting on page 15.

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What's New

MACHINERY
APPLIANCES • PROCESSES

Thermatrol Water Towers

THE first 60-ton Thermatrol Water Tower has been manufactured by Schnacke, Inc., Evansville, Ind., on an order for seven such towers for the New York area. This is the largest size being manufactured with sizes graduated down-

James K. Ellsworth, Vice-President, and R. E. Montgomery, Plant Superintendent, of Schnacke, Inc., Evansville, Indiana, make final check on Thermatrol Water Tower.

ward to three tons. The towers are completely assembled and include centrifugal fans. The larger towers are shipped in two sections.

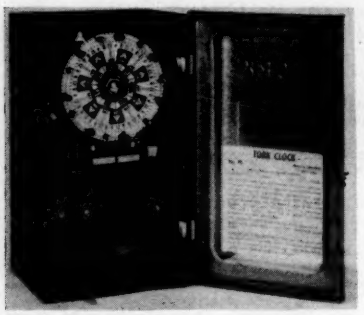
One Time Switch Dial

THE 7-Day Dial, introduced as a separate time switch by Tork Clock Co. Inc. early in 1955, has been improved and incorporated into Tork's standard line. Called the 7D1191, its slow moving dial is divided into 7 sections, marked for each day of the week.

Requiring a full week to make one complete revolution, the dial will accept screw-on trippers at even 2-hour periods in each of its daily segments, offering fine selectivity in 7-Day time switches. The use of these new screw-on trippers for ON-OFF action also permits manual operation of the time switch, if desired, without the need for relays as in former models.

The 7D1191 is recommended for use wherever daily schedules in lighting, heating, ventilating, air conditioning, refrigeration, or display signs may require variance. This would include office and industrial buildings, retail stores, and institutions.

Use of the 7D1191 makes possible the starting and stopping of a given operation at different times each day, as well as to eliminate all operations on Sundays or weekends. The screw-on trippers also makes possible easy alteration of schedules should the program vary from week to week. Nationally distributed through electrical wholesalers, the 7D1191 is also available in double-pole and other models. Where only weekend or daily omission is required, and daily On-Off schedule is constant, Tork Skip-A-Day dial is recommended rather than the 7-Day.



The Tork One-Time Switch Dial

New Device Detects Mechanical Failures

NEW OIL-TIGHT and Dust-Tight Malfunction Detector introduced by The Beta Corporation, Richmond Va., anticipates trouble and shuts down rotating equipment before costly damage occurs. Malfunctions such as failing bearings, unbalance, broken blades, and bent shafts are detected from slight increases in "roughness" or vibration.

Applications include ventilating fans, blowers, compressors, MG sets and other rotating equipment. When mounted on a fan or blower bearing pedestal it will

New Model 5 Vibraswitch Introduced by Beta Corp.

detect an impending bearing failure or unbalance caused by deposits forming on the blades. The vibration responsive switch is adjustable over a wide range of normal vibration.

New Fastening Tool

A FASTENING tool developed to fill the need for work between very light and heavy-duty fastening has been introduced by The Olin Mathieson Chemical Corp., New York. It utilizes the power generated by a manually swung hammer to seat fasteners into a variety of materials. It is furnished in a metal carrying kit, with long and short collars, ¼-inch and 3/16-inch stud holders, and drive rods. The tool

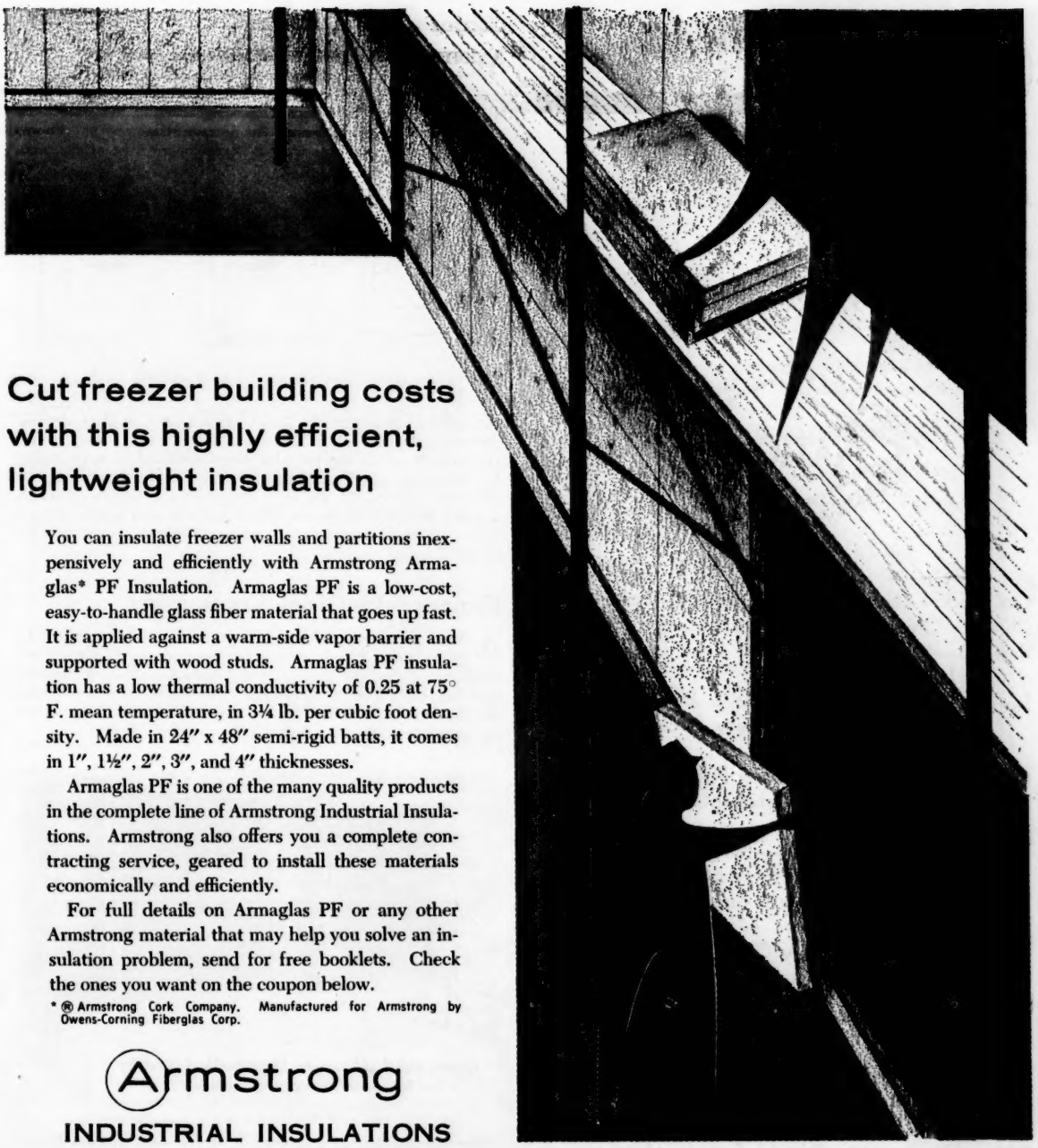
New fastening tool packed in Metal Carrying Kit.

is simple to use: (1) The rear rod is pulled out to a designated point. (2) The fastener is placed into the opposite end with point sticking out. (3) The point of the fastener is placed on the precise point where the fastening is to be made. (4) The rear rod is pressed down as far as it will go. (5) The anvil rod is hit sharply with a hammer three or four times to seat the fastener.

The tool will use a wide variety of fasteners broken down into two main groups: drive pins and threaded studs. The drive pins are for permanent installations. Drive pins come in lengths from ¾ inch to 3 inches, while threaded studs range from ⅜ to ⅝ inch, with shanks of varying length. The drive pins are manufactured by Ramset especially for Shure-Set, using an exclusive heat-treating process called Austempering, which produces maximum toughness and hardness.

New Acid Scale Remover

A NEW acid scale remover has been introduced by Garman Co., Inc., St. Louis 23, Mo. Claims for it include a higher rate of attack on scale, even though galvanize is not noticeably attacked after 24 hours of submersion in a three percent aqueous solution at 75 F. The rate of attack on zinc or galvanize is claimed not to be materially affected by either heat or higher concentrations. Since none of the available acid strength in New Vapco Scale Remover is used to remove galvanize, more strength is available to dissolve scale. Also stressed by Garman Co. Inc., is the inclusion of "Tel-Action" pH indicator strips with all Scale Remover packages which now include a 20 oz. can, a 10 lb. can, and a 50 lb drum. Purpose of the "Tel-Action" pH indicator strips is to furnish a simple, yet positive method of determining when Vapco Scale Remover is active; or is most neutralized.



Cut freezer building costs with this highly efficient, lightweight insulation

You can insulate freezer walls and partitions inexpensively and efficiently with Armstrong Armaglas* PF Insulation. Armaglas PF is a low-cost, easy-to-handle glass fiber material that goes up fast. It is applied against a warm-side vapor barrier and supported with wood studs. Armaglas PF insulation has a low thermal conductivity of 0.25 at 75° F. mean temperature, in 3¼ lb. per cubic foot density. Made in 24″ x 48″ semi-rigid batts, it comes in 1″, 1½″, 2″, 3″, and 4″ thicknesses.

Armaglas PF is one of the many quality products in the complete line of Armstrong Industrial Insulations. Armstrong also offers you a complete contracting service, geared to install these materials economically and efficiently.

For full details on Armaglas PF or any other Armstrong material that may help you solve an insulation problem, send for free booklets. Check the ones you want on the coupon below.

* ® Armstrong Cork Company. Manufactured for Armstrong by Owens-Corning Fiberglas Corp.

Armstrong

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☐ How to Select Low-Temperature Insulation

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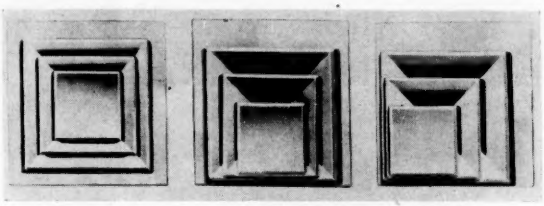
San Antonio—R. M. Hughes & Co.
Utah—Salt Lake City—Louis A. Roser Co.
Wisconsin—Milwaukee—Reichel-Korfman Co.

Carnes Model RC Diffuser

ADDITION of the Model RC diffuser to their line of commercial, industrial and residential ceiling diffusers is announced by The Carnes Corp., Verona, Wis. The Model RC diffuser it is claimed is very unique, inasmuch as the inner cones may be positioned to secure four way, three-way or two-way corner discharge patterns without disassembly or use of any tools,



New Model Carnes Corp. Convertible Diffuser

but simply by sliding the inner vanes to the position desired. Tremendous savings, it is claimed, can be made by utilizing this type of diffuser as the air inlet may be entered in any location in the ceiling, and the diffuser adjusted for any desired air distribution. The Model RC is available in two sizes with 6-inch x 6-inch or 8-inch by 8-inch square neck and also can be secured with an integral opposed blade damper adjustable from the face of the diffuser.

Kramer Adds Giant-Size Unicons

A NEW giant-sized All-Season Unicon has been announced by the Kramer Trenton Company, Trenton, N. J. Kramer officials noted that the growth in the development of the remote-type air-cooled Unicon condensers since their introduction into the industry in 1937 now makes the unit operationally perfect for installations beyond 200 tons.

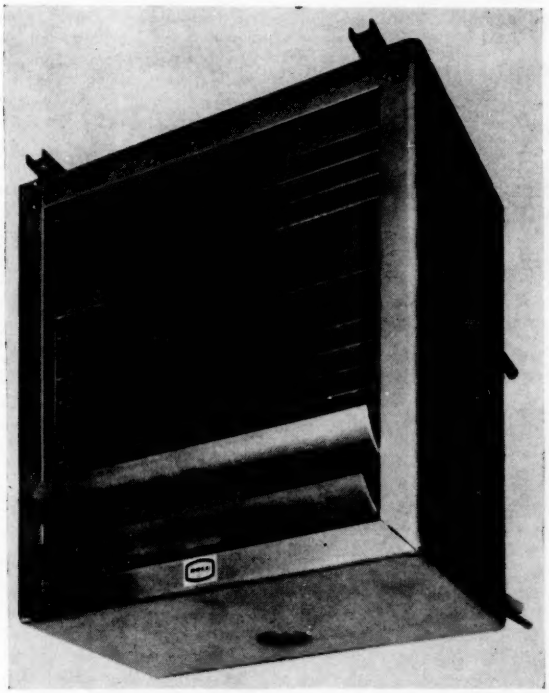
Giant sized all-season Unicon designed by Kramer Trenton Company

The demand by the industry for larger sized air-cooled condensing applications dictated the development of these giant-sized units. One of the outstanding features is the unusually low operating noise level. Even when there is a multiple installation with a number of units at one location, the noise is no problem. Careful design considerations were given to each component in the air stream as well as the air velocity and tip speeds to insure a minimum noise level. Each unit has two fans belt driven from a single motor. A unique motor mounting is used to permit easy belt adjustment. The units are completely factory assembled and do not require any field assembly.

The giant-sized unicons are also available for air-to-air heat pump application; thus making possible large heat pump applications without the use of any water or expensive installations. When used with the patented Kramer all-season winterstat, an adequate minimum head pressure is automatically maintained all the way to the expansion valve regardless of the outside air temperature. It eliminates any seasonal or daily adjustments according to the company officials.

Dole Announces New Unit-Cooler

WITH the addition of the new Unit-Cooler as a companion product to the Heat-Cel Automatic Defrost Unit, Dole Refrigerating Company now offers a complete low temperature system with automatic defrost in one package. Designed for all



New Unit Cooler of Dole Refrigerating Company

low temperature applications the new heat-cel automatic defrost system, it is claimed, assures maximum unit cooler efficiency by maintaining a frost free unit cooler coil. This "one package system" is available in matched unit-cooler and heat-cel sets to meet heat load requirements. All models are available as separate items. A two color specification folder giving detailed information is available upon request.

New Plastic Truck Body

THE HEIL Company, Milwaukee, Wis., has designed a one piece plastic refrigerated truck body which will have a considerable effect on transportation of perishables. The company claims the body of this truck, made of a molded "sandwich" of reinforced plastic and rigid type insulation as "the first truly new concept in refrigerated truck transportation to be developed in the last 25 years."

The sandwich is built of polyester resin (plastic) glass cloth and balsa wood, in this case to a thickness of about two and three-fourth inches. The truck body is similar to that used in the Chevrolet Corvette sports car, it was explained.

"The Frigid-Van's ability to maintain a lower temperature for a longer period of time than conventional bodies is of particular importance today as the demand for better refrigeration protection increases with the steadily increasing distribution of frozen foods, frozen meats and other perishables," said Joseph F. Heil, the firm's president. "Having overcome the problems connected with large size one piece structural moldings, we see no obstacle to the production of refrigerated trailers and even refrigerated railroad cars," he said.

Among the advantages claimed are lighter weight, allowing a 20 percent greater load than a conventional body of the same size; avoidance of moisture accumulation in the walls, which amounts to 400 to 500 pounds after a few years in service in ordinary types; higher impact strength than steel, and freedom from rust and corrosion.

SHANK
AMMONIA VALVES

Rugged and Accurate Construction
For Long-Life and Dependability!

Largest Line of Ammonia All-Steel Cadmium Plated Bar Stock Valves in the Industry

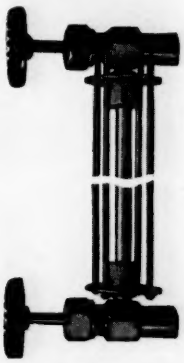
IMMEDIATE DELIVERY
ON OUR COMPLETE LINE

ALL-STEEL GAUGE SETS

Automatically shut-off liquid in case of glass breakage.

For Ammonia, Freon and Methyl Chloride.

All parts are rust-proofed by plating. Valve stems are packed with composition packing rings which insure a long-life, no-leak seal.



RELIEF VALVES

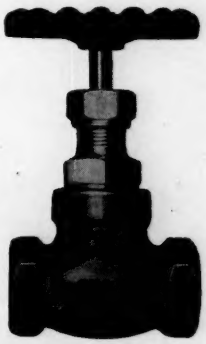
For Ammonia and Freon. Angle type, one-piece body with screwed ends and rust-proofed finish.

Positive relief action and reseating are assured by the design of the seat used. For 3/8", 1/2", 3/4" and 1" pipe size.

SEMI-STEEL
SHUT-OFF VALVE

Made of highest grade, non-porous metal obtainable.

Double-seated stem is of rust-proofed steel. Valve ports are full size insuring maximum flow. Composition packing ring is impregnated with graphite for ease of operation and will not deteriorate in service.



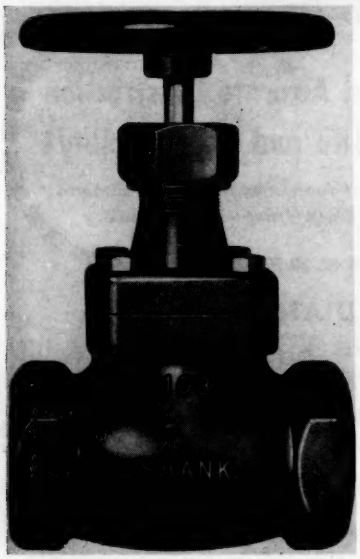
Write for catalog.

CYRUS SHANK COMPANY

4650 West 12th Place, Chicago 50, Illinois

New Bonnet Shut-Off Valve

A NEW, sturdy heavy duty, bolted bonnet type of shut-off valve, provided with back-seating for repacking under pressure, has been announced by Cyrus Shank Co. Chicago, Ill. New features have been incorporated including: A swivel and self-aligning seat of soft metal alloy; Ample ports that provide full capacity, and Hand wheels well proportioned for easy operation. This valve is available for immediate delivery in both globe and angle types, pipe sizes 1¼, 1½, 2 and 2½ inches.



New bolted bonnet shut-off valve announced by Cyrus Shank

New Flake Ice Machine

A NEW Remote Model Instant Ice Machine is announced by The Liquid Freeze Corporation, Oakland, Calif. This machine, according to the manufacturer, produces from 600 to 1200 lbs. of ice flakes per 24 hours, depending upon which of six condensing units is installed with it. It is small in size for its flexible range of production, 30 x 33 inches high, light in weight and convenient for installation in locations where space is a problem.

Instant Ice Machine, Model R-612

New Light Weight Bender

A NEW light weight RC remote control bender is announced by Tal Bender, Inc., Milwaukee, Wis. The net weight of this device complete, is only 68 lbs. This is a "One Shot" bender making any degree bend in one setting, and is available for pipe or rigid conduit, bus bar and for radiant heat. It can also be had to bend EMT or copper tubing, and with a pipe straightener, if used with the standard all purpose frame.

Applying new light weight bender.

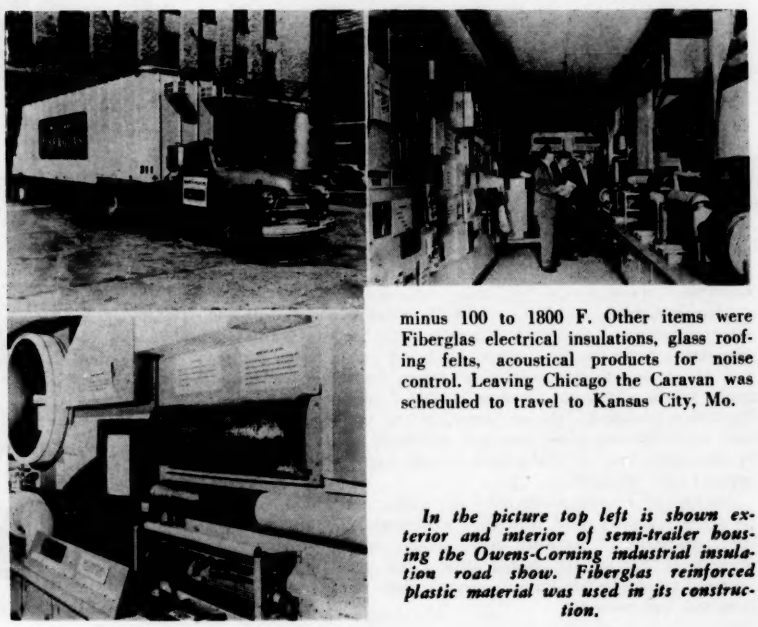
This bender is available with bending shoes for 1 to 2 inch No. RC 200/C or for ½ to 2 inch No. RC 200/PH. It can also be obtained with an electric motor pump, can be used anywhere on the job and in any position and saves considerably by cutting, threading or welding, and on the handling and assembling of cut-up pipe, put together with welded or threaded fittings. The bending frame has a removable top-plate which permits laying the pipe in from the top, slide in from the side or hook the bender over installed pipe.

Rubber Protective Coating

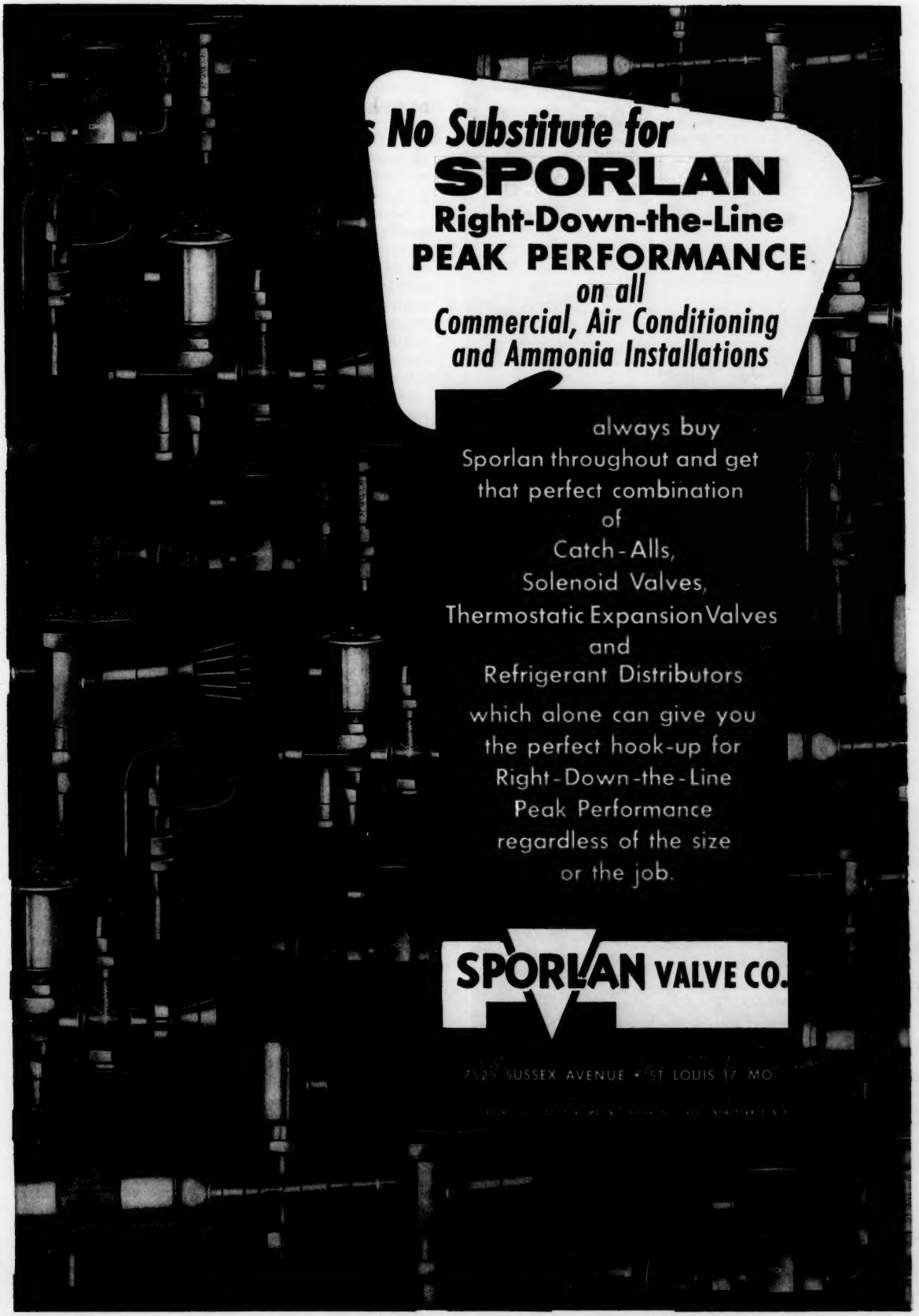
NEOPRENE is a new type of synthetic rubber made by Du Pont for providing high resistance to many organic and inorganic chemicals. It is possible now to supply essentially the same Neoprene Coating in a liquid form suitable for brushing or spraying without having to watch the shelf-life of the liquid product. For years, Neoprene has been accepted by chemical engineers as the ideal rubber protective coating against acids, caustics and solvents. Now the protective features of Neoprene are available in a practical, brushable film, applicable to structural steel shapes, pipes, and irregular areas, marketed by The Wilbur & Williams Co., Boston, Mass. It is expected to find a ready use in the painting of air-conditioning equipment, louvers, and cooling towers, exteriors of tanks, trucks, and railroad tank cars used for hauling various corrosive chemicals and solvents, food equipment, to patch and repair canvas belting and rubber hose and other uses.

Traveling Exhibit of Fiberglas Industrial Insulation

THE Fiberglas Industrial Maintenance Caravan, sponsored by Owens-Corning Fiberglas Corporation, has traveled some 10,000 miles demonstrating the various uses of Fiberglas insulation. Recently it was in Chicago for six weeks ending June 8 where 200 people toured the display. On display were "mock ups" of industrial insulations for pipes, vessels, and rooms covering temperature ranges from minus 100 to 1800 F. Other items were Fiberglas electrical insulations, glass roofing felts, acoustical products for noise control. Leaving Chicago the Caravan was scheduled to travel to Kansas City, Mo.



In the picture top left is shown exterior and interior of semi-trailer housing the Owens-Corning industrial insulation road show. Fiberglas reinforced plastic material was used in its construction.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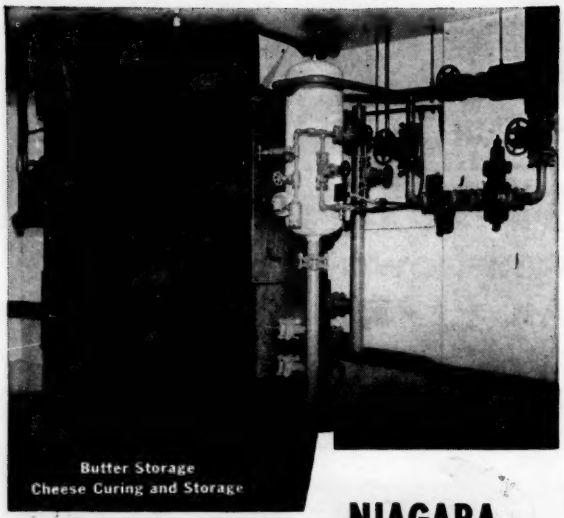
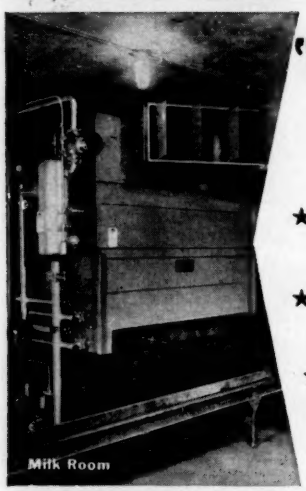

Butter Storage
Cheese Curing and Storage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25 Years Successful Experience

★ Protect frozen food quality

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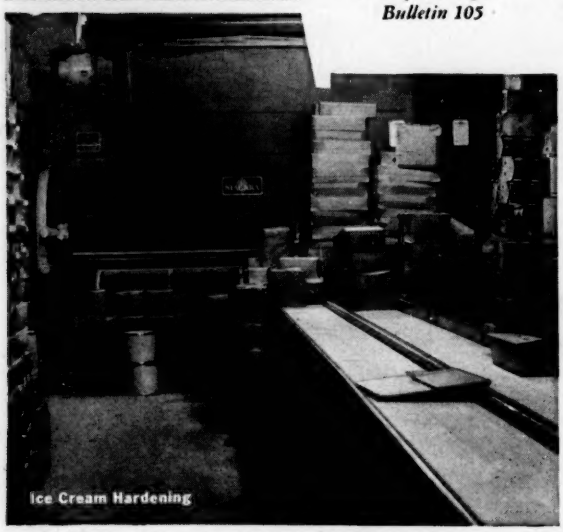
Ice Cream Hardening

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District Engineers in Principal Cities of U. S. and Canada

PRESS BRIEFS

Milwaukee Limits Air Conditioning Water

TWO proposals to ease the demand for city water by regulating its use in some air conditioning systems were introduced in the City Council of Milwaukee, Wis. E. A. Schmidt, city engineer, urged that the council:

Adopt an interim ordinance that would require the installation of water saving devices, such as cooling towers and recirculating devices on most new water cooled air conditioners. It would not apply to air conditioners that use refrigeration units for cooling, nor to small water cooled systems in homes, but to systems in stores, industries and office buildings.

Authorize city engineers to study the possibility of drafting an ordinance that would provide a demand charge for cooling systems that use water. The charge would be based on the size of the air conditioner and would be in addition to the water costs.

The demand charge, Schmidt explained, would be levied for the privilege of using water for air conditioning at a time when water was in peak use for other purposes. It would be similar to demand charges for other utility services and would be based on rated tonnage of each unit.

The intent, it was explained, would be to induce owners of water cooled conditioners to install water conservation devices. If water conservation installations were made, the owners would be exempted from payment of the demand charge.

The two proposals were referred to the council's utilities committee.

Fish Packed in Antibiotic Ice Receives Final Test

A SHIPLOAD of fish, specially packed in ice containing antibiotics, was landed at Aberdeen, Scotland, June 8, as part of an experiment in fish preservation. Scientists said the fish, some of which had been on ice nearly three weeks, were a week fresher than ordinary because the ice had been treated with aureomycin, an antibiotic.

If it can be proved that the aureomycin is destroyed when the fish are cooked, the new method may be given government approval and offered to interested fish merchants and trawler men. An official of the British Scientific and Industrial Research Department said the trawlers could stay out "seven to ten days longer" and still bring their catches to port in good condition.

Man Dies in Dry Ice Truck

A REFRIGERATED truck was loaded with dry ice at Baltimore recently and started for Wilmington, Del. A short time after it left, employees at the plant noticed one of the workers was missing. State police were asked to check the truck. Troopers located it just across the state line into Delaware. Inside the truck they found Thomas George Hock, 34 of Baltimore, dead.

The Delaware state medical examiner said Hock, a maintenance man and father of three children, died of asphyxiation from the carbon monoxide fumes produced by the dry ice. Police said he had made a terrific struggle to get out of the truck. He had torn a foot-wide hole through plywood sheathing and insulation of the six-inch-thick door of the two-ton truck. But he had been unable to pierce the metal outside of the door.

Air Conditioning of Chicago Hotel

THE AIR conditioning program of the Drake Hotel, Chicago, has been completed, making it completely air conditioned. The program, started in 1954 completes one phase of the Drake's multi-million dollar refurbishing plans which will make it the most up-to-date hotel in the area.

The air-conditioning system was installed by Refrigerations Systems, Inc., of Chicago. The system as installed consists of a 750-ton refrigerating compressor, a water chiller, and a circulating pump, installed in a penthouse room immediately under the roof, and an evaporator condenser installed outdoors on an adjacent roof. The room cooling units were installed in the top of the closets and vary in size, according to the size of the guest rooms. These units are connected to vertical riser pipes which run from the lowest floor served to the attic space where they connect with the main distribution headers.

A three-speed switch especially made for the unit was installed for the control of each room unit. The Drake has custom designed brass switch plates so that guests can simply dial whatever degree of cooling they wish.

One of the most unusual features of the system is that the units are sized so that the windows or the transom may be opened without affecting the cooling of the room. Many guests have expressed their amazement that they could have the windows wide open on the hottest days and still enjoy comfortable room temperatures. The noise level of each unit is less than that made by the average electric fan.

City Products Buys Oil Refineries

PURCHASE of Premier Oil Refining Company of Texas for approximately $3,500,000 cash is announced by Wm. J. Sinek, Chairman of the Board, City Products Corp. Premier owns modern refineries at Fort Worth, Longview and also a small refinery at Baird, Texas; a gathering system for these refineries consisting of over 750 miles of pipe lines in the East Texas and Ranger fields; and, in addition, partial ownership in 57 producing wells.

Premier products are marketed under the brand name of Premier and are distributed through approximately 100 independent distributors and 700 independently owned service stations in the Dallas-Fort Worth-Longview and adjacent areas. R. P. Hargis remains as president in charge of all operations. It is estimated that sales in 1956 will exceed twenty-two million dollars and that profits of this operation are expected to show a substantial return effective immediately.

With this acquisition, City Products Corporation adds substantially to its Natural Resources Division and further diversifies its operations. Prior to this purchase, the Natural Resources Division was primarily interested in the exploration and production of oil and gas, having a substantial interest in 55 producing wells in Oklahoma, Kansas and Texas areas.

Ice Company Appeals On State Use Tax

AN APPEAL from a use tax of $473.48 judgment against the Fischer Artificial Ice & Cold Storage Co., Dubuque, Iowa has been filed with the Iowa Supreme Court. The judgment was assessed by District Judge Eugene J. Kean who ruled that the company is not a food processor within the meaning of the law and thus is not entitled to exemption from the use tax for electricity.

Distilled Water?
No...
DISTILEX

Distilex renders raw water the same as distilled water for ice making, and increases tonnage production by decreasing the number of hours required to freeze untreated water.

Distilex, safe and easy to use, prevents white butts, and eliminates cracking while ice is being frozen, dumped or cut. Economical — Distilex costs less to use than cracked bar losses.

THE CSCO STABLEIZER MAINTAINS GOOD BRINE
by a positive reaction to either over-acidity or over-alkalinity!

A scientific combination of pure metals upon which damaging materials in brine will "feed" in preference to the brine tank or ice cans, thereby SAVING them!

The CSCO STABLEIZER removes destructive material from the brine without adding harmful chemicals. Easily installed in all systems. No other brine treatment compares in SAFETY! The STABLEIZER does not make brine harmful to workmen's hands. ... protects and preserves expensive equipment!

USE
SOLVEX
FOR COMPRESSOR
COOLING SYSTEMS

High head pressures quickly lowered with this remarkable chemical. SOLVEX can be quickly applied without breaking a joint. Removes rust, scale, algae, oil and encrusting matter from condenser tubes and water jackets in one to five days operation. Ideal for cleaning scale and corrosion from boilers, heaters and tanks.

An effective conditioner for spray ponds and cooling towers. SOLVEX goes to work immediately without costly shutdowns. Cooling efficiency is rapidly restored by using one pound per 10 gallons of water.

Write for complete information on these aids to better ice making and cooling, manufactured by the Chemical Solvent Company — makers of quality products for over thirty years.

CHEMICAL SOLVENT CO.
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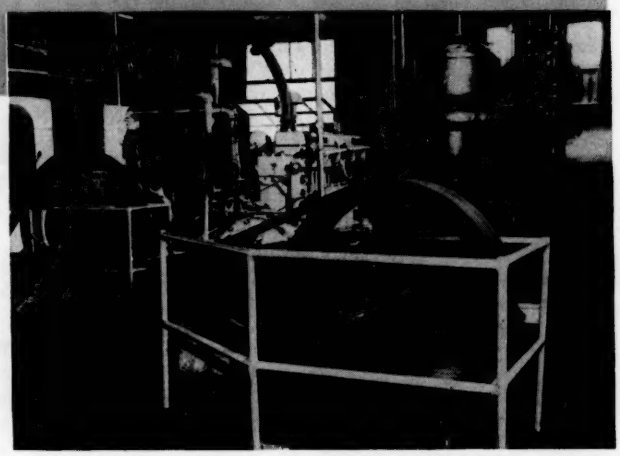
3003 N. 16th. St. ★ BIRMINGHAM, ALA.

"Three things sold me on CAT* power"

—J. B. EWING, VALLEY ICE CO., LINCOLN, NEBR.



Here are the three things that sold Mr. Ewing:

1. The ability of Caterpillar Engines to use natural gas as fuel.
2. Their steady-running, trouble-free reliability.
3. The availability of good dealer service and parts.

His two Cat D13000s have operated over 32,000 hours, working 24 hours a day throughout the eight-month full-capacity season. Both engines are used to drive Frick compressors.

Last fall Valley Ice Co. purchased a new Cat D342 Engine to replace one of another make. Added to the two D13000s, it gives the plant an output of 100 tons of ice per day.

Caterpillar dependability is a byword in the ice and refrigeration industry. Cat Engines have produced records as high as 100,000 work hours, and many old-timers are still on the job after paying for themselves many times over.

Today there are two *new* spark-ignition Caterpillar Engines—the D397 and D375—specially equipped for economical use of natural gas. The 10 to 1 compression ratio, unusually high for natural gas engines, means increased efficiency. And the spark coil at each cylinder and low-tension magneto give you hotter spark and trouble-free life.

Your Caterpillar Dealer can give you complete information about these new engines. And he stands behind them with prompt service and Caterpillar parts you can trust. Call him today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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MODERN HEAVY-DUTY NATURAL GAS ENGINES

In the Spotlight

SOME Industrial Refrigeration readers were a bit startled to read in "Press Briefs" last month that Illinois Bell Telephone Company was to spend in excess of $8,500,000 for air conditioning. Can so much air conditioning be used in the modern dial exchange, seemed to be the stock question. "Weather, a la carte", beginning on page 15 will explain how air conditioning is used by the Telephone Company in both an industrial and comfort sense.

SELLING information of value to refrigerated space salesmen is being issued in a series of special bulletins by The Refrigerated Research Foundation. Three current bulletins on refrigerated storage of peanuts, candies and dried and evaporated fruits are reviewed in article on page 17.

CARBON DIOXIDE gas from natural wells in the desert of Southeastern Colorado is being changed to a solid form at a plant thirty-two miles from Los Animas. The plant utilizes an advanced process which makes unnecessary the use of special heavy-duty carbon dioxide compressors. Description and pictures of the plant are presented in the article starting on page 19.

AIR CONDITIONING has been installed in the Lord Baltimore Hotel, Baltimore, Md., which will permit guests to select desired temperature for their rooms. It is now available in fourteen stories on one wing of the hotel. Fan window units in each room filter and recirculate the air and heat or cool the rooms as required. For description and pictures see article starting on page 21.

A TECHNICAL Center has been opened by General Motors at Detroit to apply scientific findings to practical industrial usage. The new plant is located on a 300 acre tract, with 25 buildings housing workshops and laboratories and employing more than 4,000 engineers, researchers, designers, mechanics and other specialists. Here the emphasis is on advanced engineering and research. A visit to this plant will be a feature field trip for members and guests of the NAPRE convention at Detroit. For description and pictures see page 41.

THE MOGEN David Wine Corporation is expanding its Chicago plant to increase production capacity and to add two new wines. Two separate refrigerating systems are to be used, one for the tank room for fermentation control and one for chilling the wine. See page 27.

THE LATEST developments in air conditioning were discussed by engineers at the Annual Meeting of the ASRE. Among the subjects considered were packaged units or central plants, application of air cooled condensing equipment, condensing surface for air cooled equipment. Abstracts of the papers and discussions are given in the article starting on page 25.

REFRIGERATED Warehouse capacity October 1, 1955 had increased by 65 million cubic feet since 1953, according to a biennial survey by the United States Department of Agriculture. Gross capacity in October, 1955 amounted to 813 million cubic feet. A preliminary report on the complete survey is published on page 28.

RESPONDING to a claim that 53 percent of refrigerating plant failures were directly attributable to the operating or maintenance personnel, NAPRE, in this issue on page 29, publishes the second in a series of six articles designed to help engineer and management improve on the plant operating longevity. Bert C. McKenna, NAPRE's vice-president, draws an analogy between functions of the refrigerating enterprise and the physiological activities of the human. He tags the compressor plant as the heart of the refrigeration application, and prescribes a few maintenance routines for longer plant life.

FOOD INDUSTRY spokesmen predict that within a few years, 35 percent of all meat consumed will be prepackaged and frozen.

What is Air Conditioning?

THOUGH everyone is interested in air conditioning as relief from summer discomfort it is surprising how many people are not aware of what actually constitutes air conditioning.

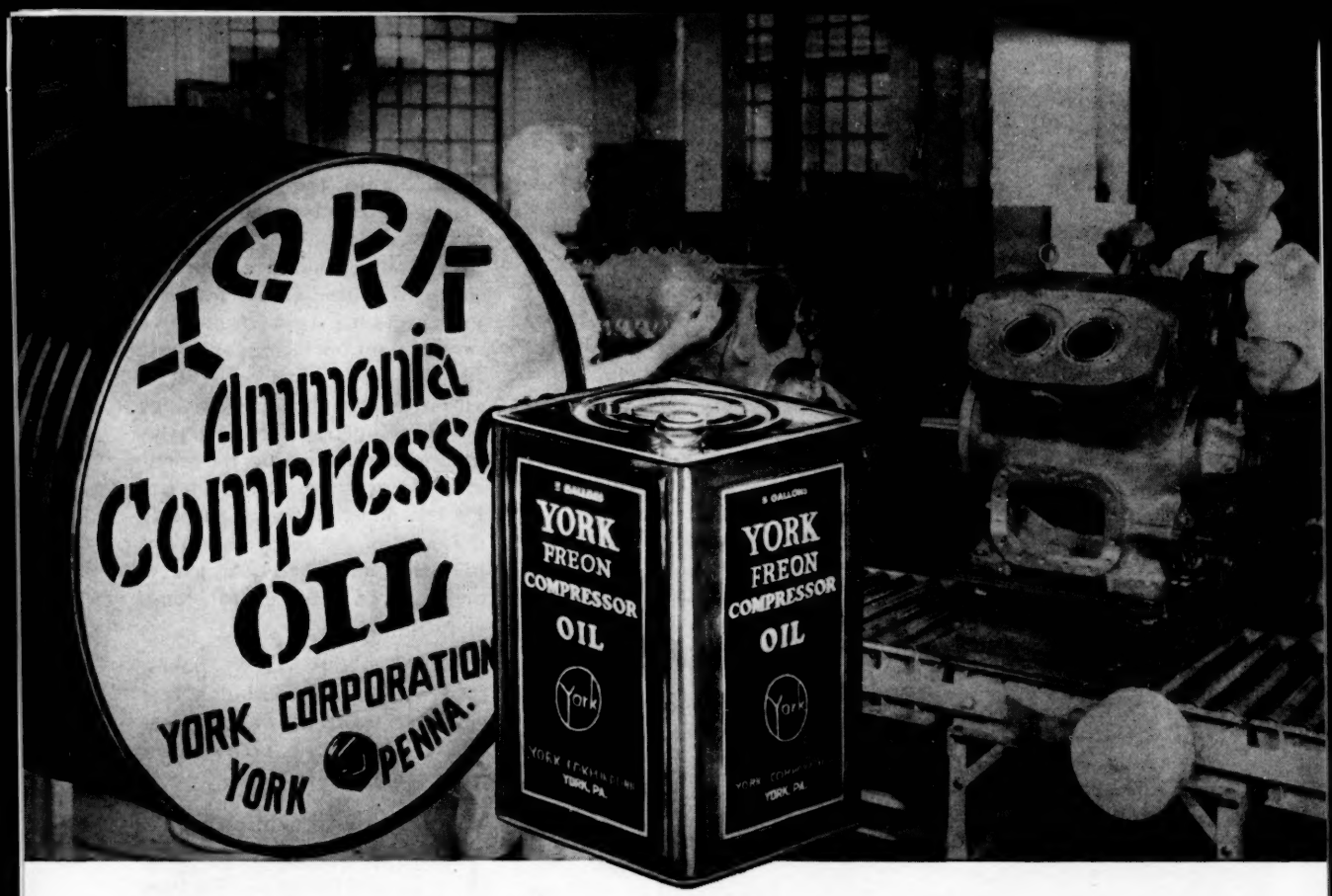
To some air conditioning is a window fan, to others it is a mysterious something which makes a place an inviting escape from the hot sun. Others know it has something to do with making hot air cold. Few people realize that true air conditioning provides comfort in all seasons of the year.

As a means of clarifying the situation a simplified definition of air conditioning has been prepared and adopted by the American Society of Heating and Air-Conditioning Engineers.

The definition announced by Society President John W. James, Chicago, Ill., at the recent Semi-Annual Meeting of the Society in Washington, D. C. reads as follows:

"Air Conditioning is the process of treating air so as to control its temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space."

It is the hope of the Society, according to Mr. James, that this definition will prove helpful to the public when considering the selection of equipment.



Behind York Oil Quality:

EXPERIENCE in manufacturing compressors

York Compressor Oils are the only oils on the market developed and produced by a leading manufacturer of refrigeration compressors

For over 30 years York has been producing oils specifically compounded and refined for the special requirements of refrigeration and air conditioning equipment. The knowledge and experience gained from these years of service and maintenance for such equipment helps York produce the very best in Refrigeration Compressor Oils. *Any* make of compressor benefits from their use.

York Oils are super-refined to withstand *both* high and low operating temperatures and bearing pressures under which they must lubricate moving parts of a refrigerant compressor. York Oil keeps compressors free of carbon on valves and gummy deposits on piston rings. It is chemically stable, bone dry, won't break down.

All over the world, trouble-free operation of hundreds of thousands of compressors lubricated with York Oils provides overwhelming evidence of York Oils' superior quality and ability to function perfectly under widely varying conditions.

YORK OIL IS STOCKED AT ALL YORK CORPORATION DISTRICT WAREHOUSES.

It always pays to use York Accessories & Supplies:

AIR FILTERS • AUTOMATIC CONTROLS • BRINE TESTING SETS • CHARGING CONNECTIONS • COILS AND PIPING • COLD STORAGE DOORS FREON REFRIGERANTS • GAS MASKS • ICE CANS • ICE PLANT ACCESSORIES • MOTORS • PUMPS • OILS • OIL TRAPS • PURGE DEVICES RECEIVERS • SUCTION TRAPS • VALVES AND FITTINGS

York refrigeration air conditioning

the quality name in refrigeration oils

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

Weather A la Carte

Illinois Bell Telephone Installs Air Conditioning For Comfort of Employees

WILLIAM B. SALZMAN
Chicago Area Engineering
Bell Telephone Company

Practical engineers are placed in charge of operating air conditioning equipment at Illinois Bell Telephone installations, and they take an interest in the "know-how" of inspection, operation, maintenance and trouble-shooting all types of units under their care. Evidence to that claim lies in the fact that an even two dozen active members of Chicago Chapter, NAPRE, are from Illinois Bell Telephone. Nicholas M. Downes, in charge of Air Conditioning and Refrigeration Section of the Illinois Bell Telephone Plant School, is serving his second term as Chicago Chapter President. One of the Chapter's Directors is Earl J. McMichael of the Chicago Area Engineering Dept., Heating & Ventilating Division. Rocco J. Ermillio, the Chapter Sgt.-at-Arms, is employed in the Building Maintenance Dept. which is responsible for air conditioning operations.

AS ANNOUNCED in the July issue of INDUSTRIAL REFRIGERATION, installation of air conditioning equipment by the Illinois Bell Telephone Company in 36 additional buildings is now in progress and will be completed by the end of this year. When this work is finished, about 47 percent of company space will be conditioned. This includes all space since the air conditioning program was started around 1947.

According to the Bell Telephone News, late last year it was decided to air condition all Illinois Bell operating rooms, equipment and office space. Naturally such a vast and costly undertaking must be carried out on an orderly basis over a period of several years. The order of priority in which space is to be treated was determined through interdepartmental discussions. The spaces receiving air conditioning first are those which in the judgment of the departments most need treatment. The decisions were based on such considerations as number of people involved, room temperature, degree of confinement of work and other qualifications.

During this year the company expects to start a treatment of operating rooms in 13 buildings and two or three plant equipment rooms in Chicago Area. In State Area a start will be made on 13 operating rooms, 14 business offices and 13 plant equipment rooms.

Just what is air conditioning?

The engineer, as usual, complicates things by defining it as, "The simultaneous control of all, or at least three, of the following factors affecting both the physical and chemical conditions of the atmosphere within a structure: temperature, humidity, motion, distribution, pressure, dust, bacteria, odors, toxic gases and ionization.

But to the moist party whose rivulet-streaked forehead is soothed, air conditioning simply means cooling.

This non-technical description comes close to the mark, since that is the most noticeable and dramatic benefit. It's this cooling effect that helps people keep working and makes life worth living during the Dog Days of summer.

Telephone equipment people, however, can tell you some interesting things about other benefits of weather a la carte. They point out the dollar and cents savings effected by filtering dirt out of the air and maintaining the proper humidity. Maintenance costs on the maze of dial switching equipment goes down with the influx of conditioned air.

Housekeeping and decorating savings also are something about which to write home. The girls would surely like to have dusting reduced from once a day to once every two weeks. In air conditioned space just that has been done. Redecorating has been cut from an annual to an approximate 10-year interval. Any "do-it yourself" painter can well appreciate the time and money to be saved by cutting decorating frequencies so drastically.

Imagine yourself responsible for keeping the equipment in a typical cross-bar dial central office in tip-top shape with a minimum of service interference. You'd know from experience that about half of a switchman's time is spent in clearing trouble. How would you feel if someone told you that you could reduce that trouble-clearing time by a third with air conditioning? You probably would wonder why it hadn't been done sooner.

Air Conditioning Relatively New

For one thing, modern air conditioning is a comparatively recent development. When many telephone buildings were constructed, the art of air conditioning was not highly developed nor was it considered economically sound. Tailor-made weather in telephone buildings was just something of which to dream.

And when air conditioning had come of age, it brought up a problem of money. Dollars had to be poured into a terrific plant expansion program to overcome war-created shortages and catch up with the demand for telephone service. Of course it was realized that air conditioning would be a good investment. As new buildings came into being they were built with air conditioning. But it was an expensive job to go back and install the cooling equipment in existing buildings. The total cost of the air conditioning now planned is expected to run around $8,500,000. A capital investment of this size must be spread over a period of years.

Even if there were no other reason for air conditioning, of course, there is the personal comfort of workers to consider. Telephone people are no different from others: they can do a better job and feel better working in air conditioned quarters.

The old saying, "There's more than one way to skin a cat," applies to air conditioning. Each situation is different and the aim is to install equipment that will fit it. Window

Story & Photos Courtesy of Illinois Bell Telephone News.

Package air conditioning unit in LeGrange gets some attention from Sidney McKay, building serviceman. Such a unit furnishes year-'round comfort.

Window units are used where long service may not be required. Joanne Hemmerling and Edna Searfoss, Barrington Traffic, enjoy the unit's effect.

units are being used in many places where long service may not be required or where building design makes other methods impracticable. These are the same type that are installed in many homes.

In other locations self-contained package air conditioning units are used. These contain in one enclosure filters, fans, refrigeration compressors, cooling coils and heating coils, hence the name "package". Many of these units are used in stores and restaurants. They are quickly and easily installed and are ideal for smaller quarters where longer life is expected. The package unit usually is located in the quarters it serves, or in an adjacent corridor or room. Ductwork usually distributes the conditioned air.

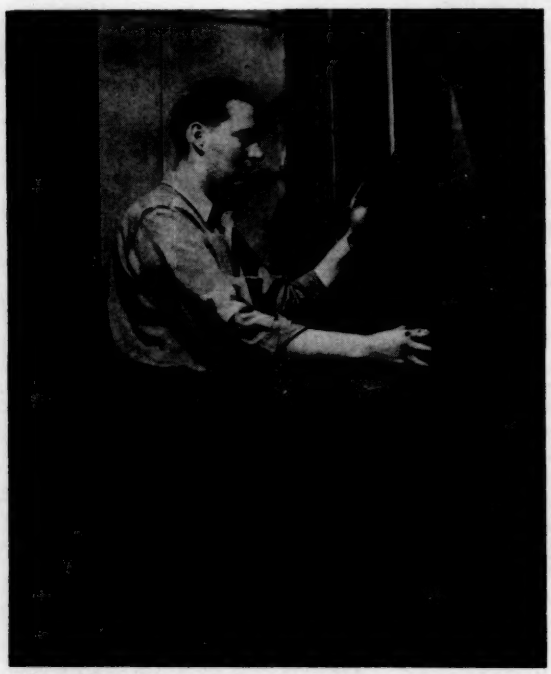
Central Systems For Large Spaces

Another type of system is the so-called "central system". This type generally is used for large installations. Instead of a self-contained package unit, several pieces of equipment are installed in a special "fan room" in the basement or on an upper floor.

This system consists of refrigeration equipment, fans, and a housing —a large sheet metal chamber to contain filters, coils and supply fan. A mixture of fresh air and recirculated room air is pulled through the housing. On its way it is filtered, heated, cooled and humidified or dehumidified. The supply fan blows it through the ducts to various parts of the building.

These are the principal types of

(Continued on page 58)



Filters like this one being changed by Robert McNulty at Irving Office are only the first step in removing dirt from air. Two other types help guarantee air's purity.

Centralized control panel in Hammond tells Edward Adams that the system is operating efficiently and supplying the building with cooled and filtered air.

Bulletins Point To Selling Possibilities For Refrigerated Space Salesmen

AN EDUCATIONAL program for cold storage and refrigerated space salesmen has been inaugurated by The Refrigeration Research Foundation as a means of developing a more intelligent and aggressive sales promotion. It was pointed out at the annual TRRF meeting that while information has been developed on leveling of marketing and more orderly processing of food products, these products have not shown increased storage consistent with what could be stored from present production, and that the information in these sales memos could well be used by salesmen to attract more products for storage. Of current interest are recent bulletins on refrigerated storage of peanuts, candies, and dried and evaporated fruit.

Refrigerated Storage of Peanuts

The Practice of cold storing peanuts by shellers and users has changed markedly during the last decade. Until a few years ago, shellers held nuts in common storage until warm weather in April, but now the trend is to cold-store nuts in November with much better protection of quality. The following table will emphasize this trend. The figures in the table represent the percentage (3 mos. average) of the preceding year's total shelled edible production and the Sept. 1 carryover that is in public refrigerated warehouses during each 3-month period.

Reading across this table, it is obvious that there has been a steady and healthy growth of tonnage of peanuts in storage during the three month periods of Sept.-Nov. and Dec.-Feb. each year since 1948. It can also be noted, however, that since about 1950, the amount of peanuts in storage during the Mar.-May and June-Aug. Periods, has fluctuated from year to year in the same percentage of crop stored range.

The net result, as evidenced in the last line of the table, is that the 12-month average amount of peanuts in storage has gradually increased from 1.92 percent of the shelled edible crop and carryover in 1948-49 to 6.41 percent in 1954-55. This 12-month monthly average figure is arrived at by adding the stocks of peanuts in cold storage for 12 consecutive months as reported in the Cold Storage Reports and dividing by 12. This figure should be a convenient indicator to determine the relative amount of peanut stocks that have been subjected to cold storage during a given crop year. This points out one problem that exists in trying to estimate what portion of the potential peanut tonnage we now refrigerate, — that is, there is no record of monthly movement in and out of storage for peanuts.

Another figure which might be used to determine what proportion of the potential tonnage we are handling is that of the stocks in storage during the peak month each year. Dividing these peak month values by the total production and carryover, it is found that the amount of peanuts in storage during the peak storage month has been running between 7-8.5 percent of the total crop for the last three years.

Certainly, we are getting more than the 6.4 or 8.5 percent of the potential edible shelled peanut business which these figures imply. About 19 percent of processed shelled peanuts are used in candy, 24 percent as salted nuts and 57 percent are made into peanut butter. Obviously, a big share of edible peanuts will be used shortly after harvest and some users will never be sold on the value of cold storage. Even after making these concessions, we feel that there is still a lot more business to be had from the refrigerated storage of peanuts than the industry now receives.

The refrigerated storage of peanuts affords a good example of the impact research results can have on the practices of an industry. The very significant trend of peanuts entering storage in the winter, rather than waiting until April, began a year after the TRRF Project on peanut storage at the Georgia Experiment Station announced its results in 1950-51. We feel that this winter storage business, as well as the total peanut cold storage tonnage, can be greatly increased through a sales effort, using the well-established advantages listed below.

Before the advantages are listed, some mention must be made to the figures in the last column in the table. You will note a large increase in the percent of the 1955 crop put into cold storage during the first six months of the crop year. In fact, the quantity of peanuts in cold storage during Dec. 1955-Feb. 1956 is about double that during the same period for the best previous year. There is no indication of why this should be, from the crop production figures. The estimated edible shelled crop in 1955 and the carryover for 1955 is 720 million pounds. This large crop follows a short crop in 1954, but is slightly below the 1954-53 average production figure. Let us hope there is no other reason for this increase in business except that the cold storage of peanuts has now really "caught on".

Here are some advantages of cold storing peanuts. Perhaps you will have additional ones from an economics and marketing standpoint.

1—Levels off seasonal surplusses to meet year-round and year to year demand. Properly cold-stored peanuts are now holding quality for two years.

2—Normal flavor, odor and color are maintained.

3—Staling and rancidity development are prevented for extended periods.

4—Absorption of off-odors and flavors is less likely in refrigerated storage than in common storage.

5—Insect infestation is prevented below 40°F.

Background information is available from The Commodity Storage Manual. Again, sales pieces in the form of reprints of research and technical results are available from TRRF, 200 Midland Bldg., Colorado Springs, Colo.

PERCENTAGE OF TOTAL SHELLED EDIBLE PEANUTS

	'48-49	49-50	50-51	51-52	52-53	53-54	54-55	55-56
Sept.-Nov.	1.55	1.55	1.57	2.62	2.95	3.27	4.21	5.25
Dec.-Feb	1.01	3.30	3.58	2.81	5.23	4.65	5.85	11.15
Mar.-May	1.90	7.02	5.78	4.80	7.40	6.38	7.89	
June-Aug.	3.24	4.91	7.01	5.60	6.82	6.51	7.75	
Sept.-Sept. (12-mo. aver.)	1.92	4.19	4.45	3.60	5.60	5.19	6.41	

Refrigerated Storage Of Candies

THERE is a very large potential tonnage and revenue from candy storage. The figures on the quantity of candy in refrigerated storage are quite revealing. A recent TRRF survey indicated that the amount of candy stored in coolers and freezers has increased 50 times in the last 10 years. Even with this volume increase, a look at the candy production figures (2,667,000,000 lbs. in 1954) shows that the storage potential for the majority of candy types is virtually untapped. This huge candy production is the work of only about 350 candy manufacturers in this Country and has a sales value of over one billion dollars a year.

A surprisingly large proportion of candy manufacturers, salesmen and wholesalers believe that refrigeration, below what is generally considered good air conditioning environment is detrimental to candies. Results of research at the Georgia Agriculture Experiment Station, jointly sponsored by TRRF and the National Confectioners' Association have proved this belief to be unfounded. It is now your job to go to these candy men, armed with the facts and point out not only that refrigerated storage is not detrimental, but also the definite advantages of cold storing candies.

Research has established that cooler temperature storage produces no undesirable results to candy if (a) the candy is properly packaged with a moisture-vapor-proof package, (b) the storage room is sufficiently dry, and (c) the candy in the package is brought to room temperature before opening the package.

The preceding paragraph is selling by reverse English. Here is the real "meat" behind selling the idea of refrigerated storage of candy — the benefits of cold storage to the candy manufacturer and wholesaler.

Benefits of Cold Storage

1—Staleness and rancidity are reduced as the temperature is reduced.

2—Candies can be manufactured the year round and stockpiled for periods of heavy sales, such as Easter, Thanksgiving, Mother's Day, Christmas.

3—Fading of colors, aroma and flavors is reduced in proportion to the temperature.

4—Marketing under refrigeration, even at the retail level, would extend the allowable merchandising period; would permit shipment of larger lots and maintenance of larger inventories at the point of consumption.

5—Candies remain firm as an assurance against mashing or sticking to the wrapper and fat greying is prevented.

6—Insects, which infest candies made with nuts, are rendered inactive below 40 F.

The most practical storage temperature for candy depends upon the marketing results desired. If it is desired only to keep candy firm during a few weeks in summer, then 65 F. will be low enough; if it is desired to prevent insect infestation and rapid staleness, the temperature should be below 50 F.; if freshness is to be maintained and rancidity avoided for a month or more in a stock-piling program, it should be stored at 30 to 34 F.; if the candy is being stock-piled for an extended period, 0 F. storage will be most dependable. A very few candy types, like spun-center candies, are better held at cooler temperatures, because they crack in the freezer.

A plus benefit that can result from contact with the candy manufacturer is the storage of the ingredients from which his candies are made. Many candy ingredients containing fats and delicate flavors and colors should be protected by refrigeration from harvesting until processing by the candy manufacturer.

Decline in the manufacture and consumption of nut candies in the summer is blamed on the extra difficulty of keeping the nuts free from staleness, rancidity and insects in the hot months. Yet there is no good reason for this kind of cut-back—since proper cold storing of nuts from harvest to post harvest processing time, and of nut candies is a dependable remedy. In the making of candies, about three billion pounds of agricultural products are used annually. Included among them are 126 million pounds of shelled peanuts, 44 million pounds of shelled almonds and 14 million pounds of pecan meats and large quantities of dried fruits.

Storage of Dried And Evaporated Fruit

IN THE late forties, the cooler storage of dried and evaporated fruit represented a rather large source of revenue for the refrigerated warehouse industry. Estimates indicated that 100,000 tons or more were stored each year primarily in consuming markets. This tonnage compared favorably in volume with other important storage commodities such as pears, butter and eggs.

In 1950, there was a short crop and the cold storage stocks dipped accordingly. Production increased in 1951 and remained high in the years that followed, but cold storage stocks remained at the low 1950 level. Here is the data:

Percent of total pack in cold storage during biggest month of:

1946—11.0	1950—4.5
1947—10.7	1951—5.6
1948— 7.5	1952—5.4
1949—11.7	1953—4.8

For more data to illustrate this loss in business, the amount of dried fruit in cold storage annually did average 54,000 tons per month, with a high in August and a low in January. Today's average is 17,000 tons per month.

Here is a chance to do a real sales job to regain business that should not have been lost. The dried fruit industry has not been receptive to the use of refrigerated storage primarily on the grounds of added cost. Presently, the industry follows a policy of rapid retail turnover of dried fruits which are processed and packaged throughout the year as the market demands, rather than stockpiling under refrigeration for subsequent distribution.

With the increase in consumer-packaged dried fruits and the consequent increased emphasis on retention of color and other desirable properties of palatability and nutritional value, it seems that refrigerated storage could play a larger part in the merchandising program than it does. However, the dried fruit industry seems to remain unconvinced. Either its traditions are too strong to break down or we have not adequately been salesmen of the known facts.

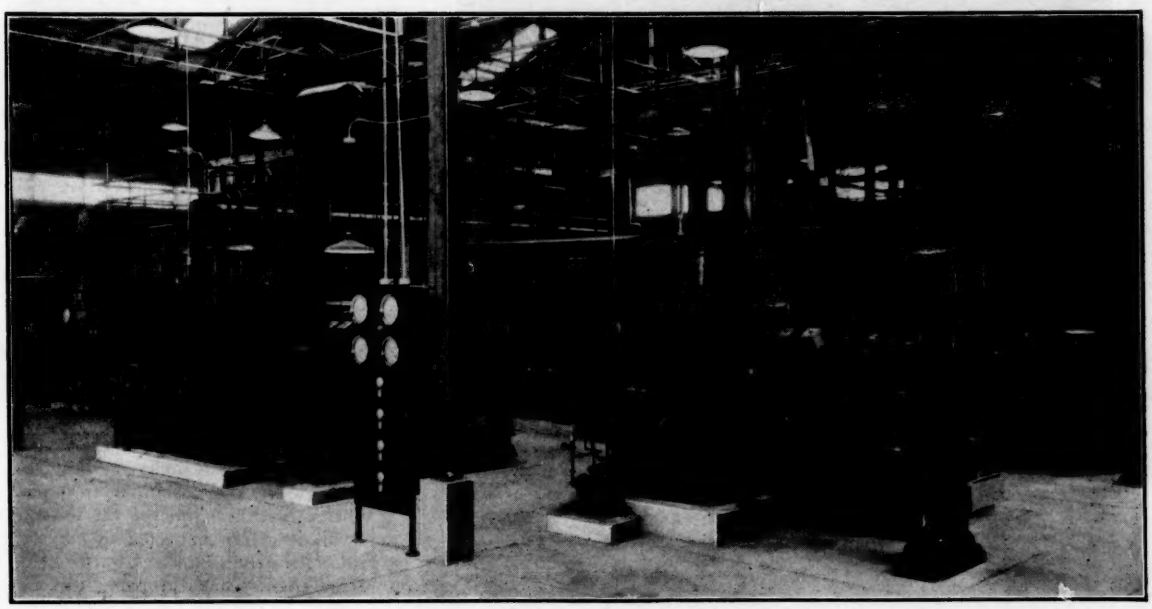
Storage Conditions

A TRRF sponsored research project years ago concluded that dried or evaporated fruit should be stored at 32 F. and 55 percent relative humidity and listed the following advantages of such storage:

1. Prevention of brown and other off-colors (especially important in consumer-package dried fruits).
2. Prevention of "sugaring". The appearance of sugar crystals on the surface or within the flesh caused by high humidity storage.
3. Prevention of mold growth.
4. Retention of sulfur dioxide which aids in preventing darkening.
5. Retention of original flavor.
6. Retention of vitamins.
7. Control of insect infestation.

(Continued on page 58)

New Dry Ice Plant Uses Standard Compressors



Four-cylinder Frick compressors handling ammonia, and 2-cylinder machines compressing carbon dioxide.

CARBON-DIOXIDE gas from natural wells in the desert of Southeastern Colorado is being changed to solid form, in quantities up to 50 tons a day, at a plant 32 miles from Las Animas. Constructed last year by the Colorado CO_2 Corporation, the plant utilizes an advanced process which makes unnecessary the use of special heavy-duty carbon-dioxide compressors.

The new industry, which stands in a lonely stretch of barren country, is a monument to the genius and insistence of Arthur Bruns, Charles C. Smith, George O. Moeller, L. E. Nelson and N. L. Moore, who organized the company. The design work was done by engineers of Frick Company.

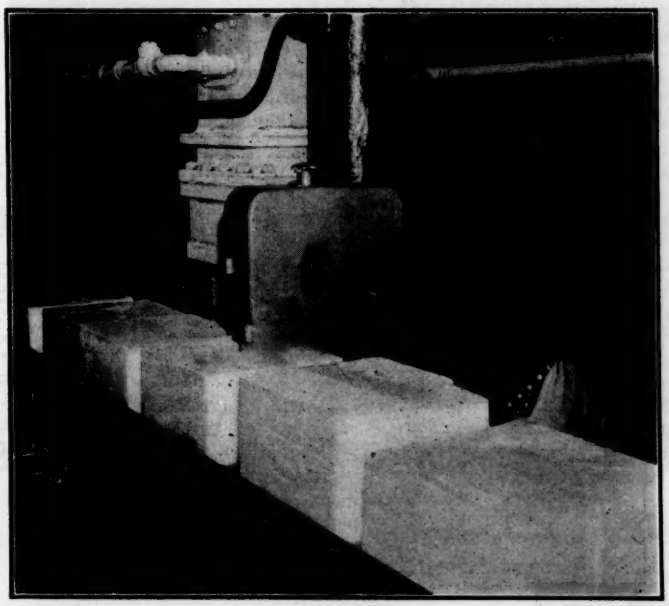
Gas Pumped Into Pipeline

The gas leaving the wells is pumped by a booster compressor into an 8-in. pipe line, five miles long. The pressure at the outlet of this pipe, where the gas enters the mixing drum at the plant, averages 25 pounds gage. The temperature in the mixer and exchanger is lowered by the cold gases returning from the snow presses. Some of the entrained moisture is removed by this procedure.

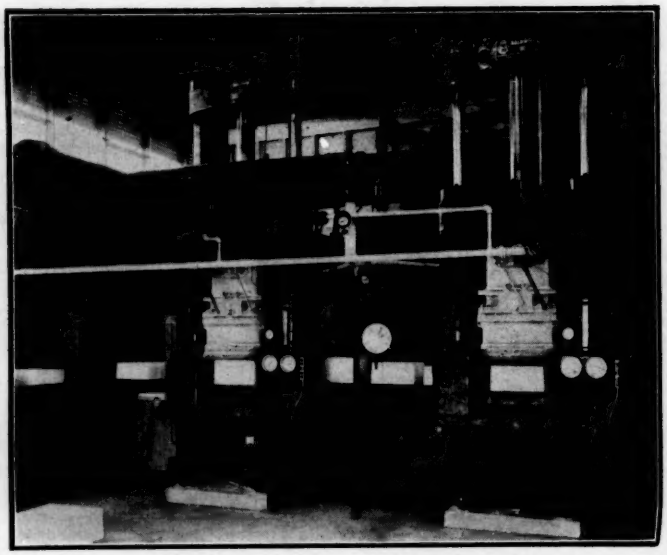
The carbon-dioxide gas is drawn from the mixer into a pair of standard 12-in. by 12-in. enclosed-type compressors, each with two cylinders. These are equipped with automatic capacity controls, hydraulically operated. The machines discharge at 250 pounds gage pressure into a water-cooled shell-and-tube vessel, which serves as a precooler and oil separator.

Next in line are four vertical oil filters, having removable heads, with the piping so arranged that they can be operated in parallel groups or in series. The cleaned carbon dioxide is then changed to liquid form in a shell-and-tube condenser. This vessel is also vertical, and has in the tubes liquid ammonia, maintained at 28 degrees below zero. The liquefied carbon dioxide is stored in a 38-in. by 18-ft. receiver.

After leaving the receiver the liquid stream goes into a single-pass heat exchanger, through which the blow-back gas from the snow machines is drawn on its way to the mixer. The blow-back gas is at 100



Sawing dry ice into blocks 10 inches square and 11 inches high, at plant of Colorado CO_2 Corp., near Las Animas, Colo.



Solid carbon dioxide at minus 109 F is produced in these presses, then conveyed past band saws in two directions.

degrees below zero, or colder. The carbon-dioxide condenser, the receiver, and the sub-coolers are normally covered with frost, and are enclosed in an insulated room.

Snow Presses

Each snow press has a chamber 20 inches square, fitted with a ram in the upper part and a power-operated coverplate at the bottom. Hydraulic cylinders, fed with oil at 2400 pounds pressure, operate the machines, each of which is capable of making up to 25 tons of dry ice per 24 hours.

To operate the press, sub-cooled liquid CO_2 is expanded into the square chamber at a fixed pressure for a fixed time. Some 42½ percent of the liquid carbon dioxide flashes into loose snow. This is compressed by lowering the piston-like ram from the top. The flash gas, representing 55 percent of the carbon dioxide, is drawn back into the system. When the compressed block of snow is approximately 11 inches deep, the chamber is pumped down, the lower head is dropped, and the solid white product is pushed on a conveyor. This takes the blocks past two DoAll bandsaws. The saws and conveyors are placed at right angles, so that the blocks are sawed into 10 by 10 by 11 inch cubes, each weighing about 60 pounds. The dry ice is wrapped in paper and is placed in heavily insulated trucks for delivery.

The ammonia cycle includes two large compressors, each with four cylinders of size 14 by 12 inches. These handle the suction gas from the system which cools the CO_2 condenser; the ammonia is fed by a No. 3 Frick float valve.

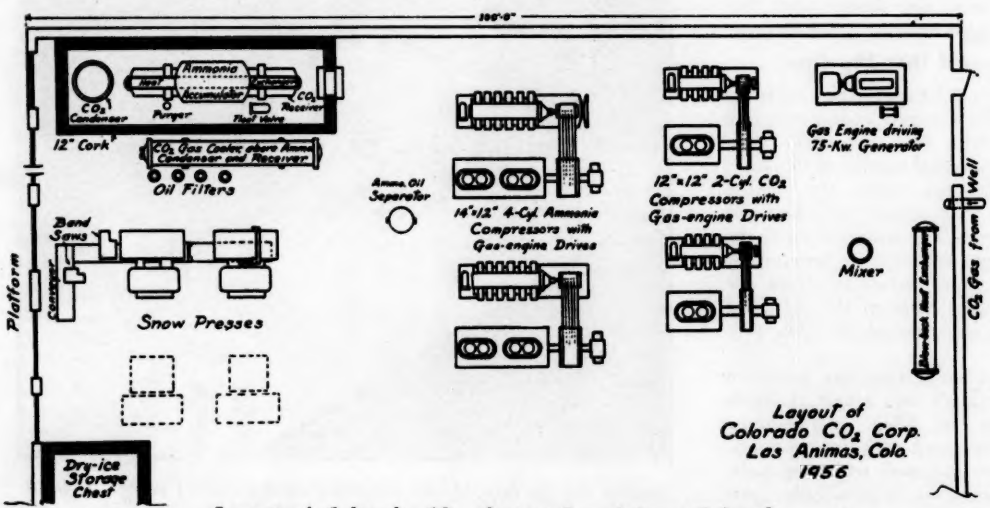
The ammonia, in turn, is condensed in an 8-pass shell-and-tube vessel supplied with water from a cooling tower. The liquid ammonia drains into a receiver measuring 24 inches in diameter by 18 feet long. This is fitted with an electronic purger.

In the photograph of the machine room, the long insulated pipe just above the tops of the compressors is the main carbon dioxide suction line from the exchanger. The switchboard, containing the pressure gages, Mercoid cutouts, and the alarm bells, is in the foreground. Behind the compressors stand the Climax gas engines which drive the machines through V-belts. A fifth engine, of 125 horsepower, is direct-connected to a generator for driving the auxiliaries. All of the engines burn propane; this is brought to the plant as a liquid in trailer trucks and is stored in a battery of six large drums, each 30 feet long.

Frick Company, of Waynesboro, Pa., furnished practically all of the mechanical equipment at the plant.

Fire Destroys Ice and Locker Plant

A FIRE caused damage estimated at more than $100,000 to the Crystal Ice & Coal Co. and the Lancaster Frozen Food Locker Co. Lancaster, Ohio. The locker plant was a total loss and the ice and coal plant was almost destroyed.



Layout of Colorado CO_2 plant at Las Animas, Colorado

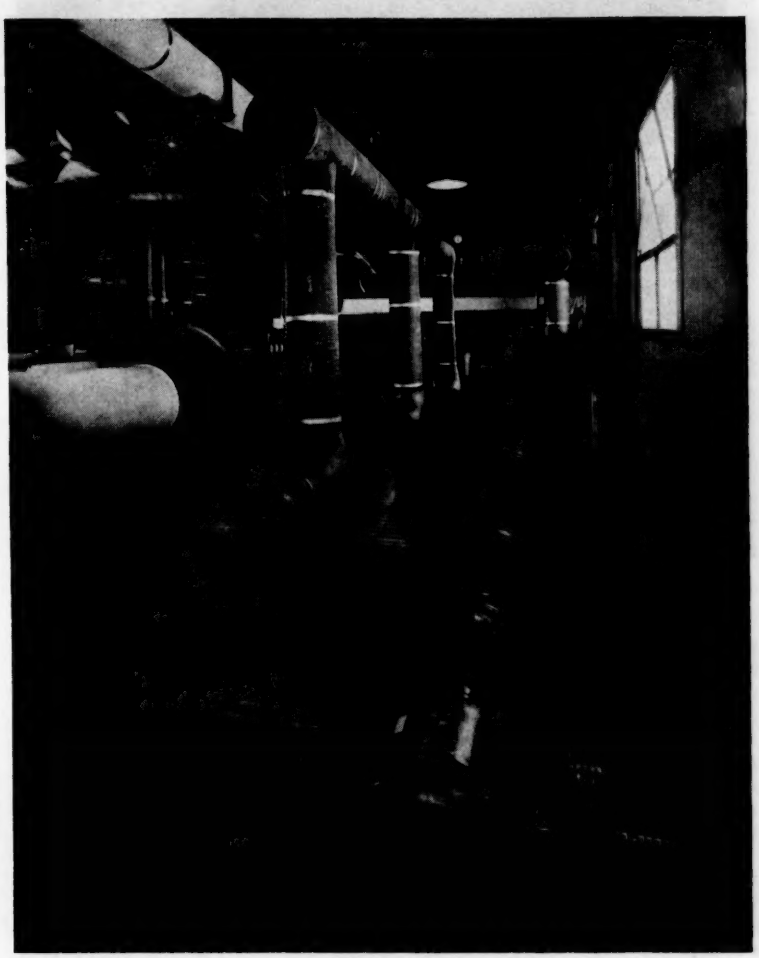
Baltimore Hotel Adds Modern Air Conditioning

GUESTS at The Lord Baltimore Hotel, Baltimore, Md., can now select "just right" temperatures for their rooms the year 'round with a new air conditioning system which cools or heats as required. The system takes care of fourteen stories of one wing of the hotel.

Fan window units in each room filter and recirculate the air and heat or cool the rooms as required. Chilled water is supplied to the window units in warm weather for cooling, and in cooler weather warm water, automatically maintained by outdoor conditions at temperatures from 75 F to 135 F, is delivered to the window units for heating. Guests control these units by a simple electric switch.

In addition, the air conditioning includes a separate air supply system for ventilation and humidity control of each room. This is secured from separate fan units in the corridors with each unit serving two or three stories. These units use outside air, filtered, heated or cooled, and delivered to the rooms through ducts and grilles. During cold weather the ventilated air is heated and, together with the window units, maintains the proper temperatures in the rooms. In warm weather the ventilating air is cooled by chilled water and assists in the cooling of the rooms.

In between seasons or in mild weather warm water may be circulated through the window units while cooled air is discharged from the ventilating air grilles. Rooms exposed to colder temperatures can be heated, while rooms close to or adjacent and warmed by the sun or occupants can be cooled by the ventilating air. Each room is ventilated by a constant supply of filtered outside air — and the noise and dirt of open windows is eliminated.



These two-inch pumps, with capacity of 125 gallons per minute handle cold water to cool incoming fresh air for the ventilating system of Lord Baltimore Hotel.

Building Problems

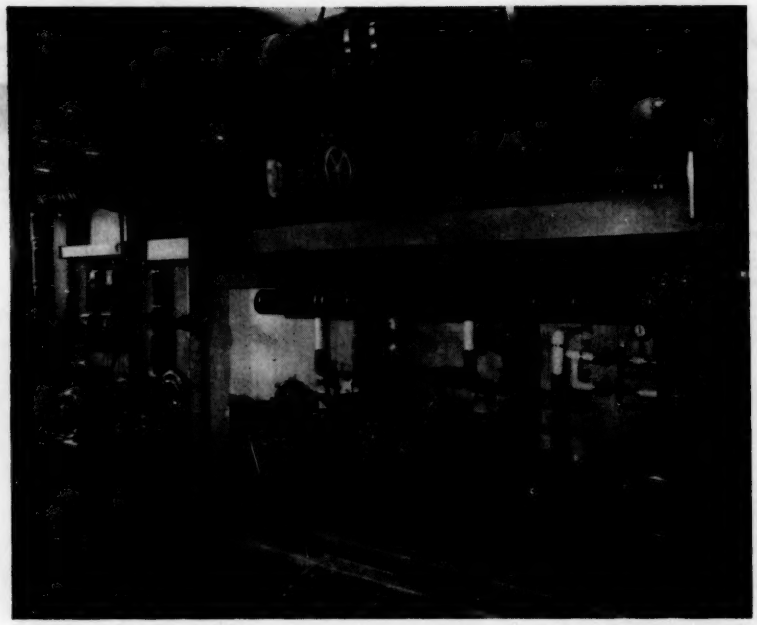
The building, erected some 25 years ago, presented a number of problems when considering air conditioning. No space was available in the lower portions of the building for equipment; no allowance had been made in the structural steel for additional loads at the top of the building; the steam and return piping of the heating system required considerable maintenance and replacement; there were no large furred spaces or roof spaces available for the main distribution piping and ducts; the usual vertical piping and duct distribution to pairs of rooms would have caused much loss of space due to the existing arrangement of columns, piers, windows, etc., and very low ceiling heights throughout the rooms and corridors increased the difficulties. In addition, the work was to be installed with the hotel in full operation during the busy fall, winter and spring seasons, and with the minimum of rooms out of service at any time.

The air conditioning system installed operates throughout the year. Fan window units in each room recirculate the air in each area, filter the air and heat or cool the room as required. Chilled water is supplied to the window units in warm weather for cooling, and in cooler weather warm water, automatically maintained by outdoor conditions at temperatures from 75 to 135 F, is delivered to the window units for heating. The window units are under control of the guests.

With the horizontal distribution used for the ventilating air supply ducts and the circulating water piping to the window units, very small air ducts and piping were required, and these ducts together with the chilled water and drain piping, were run on the existing ceilings of the guest rooms. Piping and ducts were then enclosed with transite panels. The enclosures were painted and now present the appearance of shallow beams.

Minimum Loss of Room Service

All of the above was accomplished without the loss of use of more than thirty rooms at any one time, and for a period of about one week per room. As a matter of fact during



Refrigerating and pumping equipment of new central air conditioning system for guest rooms of Lord Baltimore Hotel.

peaks of guest reservations, many of the rooms were occupied with exposed piping, ducts, etc., and in a generally unfinished condition, so that even the one week period was reduced. Most of the work was installed in the late fall and winter, and radiators in the various rooms had to be removed before the fan window units could be installed. The new units were then connected to the new water heating system, and the existing steam and return piping connections eliminated. This also was accomplished without the loss of use of rooms on account of lack of heating.

The new air conditioning plant includes hot water converters, centrifugal refrigerating machine capacity of 300 tons, cooling tower capacity of 440 tons, and nine motor driven water circulating pumps. These pumps include some excess capacity for part of the future requirements and are as follows: Three pumps, each of 700 gpm capacity, deliver water from the cooling towers through the refrigerating machines for condensing purposes. Three pumps, each of 220 gpm capacity circulate the chilled or warm water through the fan window units and the refrigerating machines or converters as required. Three pumps, each of 125 gpm capacity circulate chilled water through the refrigerating machines and the units supplying ventilating air to the rooms.

All of these pumps are controlled automatically, and are arranged to drop out of service in sequence with pre-determined weather conditions and/or water differentials or temperatures so as to reduce the horsepower requirements at light loads, etc. Automatic valves on the water lines to the room units are operated by outside weather conditions so that these pumps deliver water through the hot water converters or through the refrigerating machines as required.

The entire installation was designed and supervised by Eiser & Akers, consulting engineers, Baltimore, and was installed by L. E. Mitchell, Inc., mechanical contractors, and Blumenthal-Kahn Electrical Contractors.

Air Conditioned Tender For Off-Shore Gulf Oil Drillers

QUARTERS for the 57 men who make up the crews of a new type drilling station and tender in off-shore Gulf of Mexico oil drilling operations, will be air-conditioned. This comfort consideration was announced by New York Shipbuilding Corp. and Dresser Industries, Inc., who have teamed up to build a 2500 gross ton drilling tender and a 297 ton cargo supply ship for Coastal-Marine Drilling & Construction Corp. Intent of the new construction is to lengthen the operational radius of the drilling tender which is to be self-propelled. Air conditioning is intended to help maintain personnel morale during long weeks spent off-shore in oil drilling activities.

High Velocity, Electronic Air Conditioning System

THE FIRST complete, high-velocity electronic air conditioning system in a hotel is being installed in the Barbizon-Plaza in New York City, it has been announced by Jacob Schroeder, president of the hotel. Costing over a million dollars, the revolutionary new cooling-heating system is the result of electronic research and development work by the Trane, Barber-Coleman, Minneapolis-Honeywell and Westinghouse Companies.

Fresh, outside air will be drawn in at the top of the 40-story building. Here it will be filtered, dehumidified, chilled to 46 degrees and pumped rapidly down two main insulated 36 inch ducts. From here the air will be slowed down by diffusers and fed noiselessly to 1100 guest rooms through two and a half miles of small ducts. Stale air will be emptied outside the building. There will be no motors or noise-producing apparatus in any guest room, each of which will contain a thermostat for individual temperature control.

Heart of the chilling operation consists of two 31,000-pound Trane CenTraVacs, which will be hoisted to the building's top floor; where they will be installed. These are automatic, hermetically sealed, centrifugal compressors having 300 tons cooling capacity each. Chilling will be effected by constant recirculation of water mixed with anti-freeze and kept to a 35-degree temperature.

Relative humidity of the air will be kept at 40 percent, as against 50 to 55 percent in earlier hotel air conditioning systems, according to Mr. Schroeder. He said that the intake of air entirely from the outside of the building at the top will provide completely fresh air of maximum cleanliness for each room. He added that the system was also designed to provide circulation of fresh, heated air in winter. Jaros, Baum & Bolles were consulting engineers in collaboration with Abbott, Lester & Co., Inc., who are doing the installation work.

Air Conditioned Bus in St. Louis

AN experimental bus was put in service recently in St. Louis by The Public Service Company, operator of the bus line. A five-ton cooling unit mounted on the roof of the bus kept temperatures 10 to 15 degrees below those outside. It also dehumidified the air. The bus will be rotated on the company's express lines.

Air Conditioning Gains In Industrial Field

FACTORIES all will be air-conditioned in a few years time, John E. Haines, vice-president of Minneapolis-Honeywell Regulator Co., predicted at a Kansas State College seminar on air conditioning in Manhattan, Kans.

"The greatest and almost unexplored potential for air conditioning is in the industrial plant," Mr. Haines noted. "We are living in a highly competitive period. Workers want their comfort whether in an office or factory. It is inevitable that a very large percentage of modern plant facilities will be air-conditioned in another few years," he went on.

Including air conditioning for all the postwar New York City office buildings, Mr. Haines pointed out, has forced owners of older buildings to install cooling equipment to attract new tenants, or hold older ones. Building owners in Chicago, Philadelphia, Cincinnati and other cities are "falling in line" today in order to compete in the office rental market, Mr. Haines said.

He described studies on the average cost of air conditioning for office buildings and plant structures. "Only a small increase in efficiency and productivity is required to provide a handsome return on an air-conditioned hosiery plant," he commented. "A reduction of 25 percent in rework in a watch factory after air conditioning was added also is reported," he said.

In addition to factories, office buildings and stores, Mr. Haines forecast that modern hospitals and school buildings soon would be planned with the latest in air-conditioning systems. "Further research soon will make it possible to show accurately just how much factory production, pupil learning and hospital patients' recovery can be helped by air conditioning," he added.

Safety Off The Job

AN "Off-the-Job" safety campaign has been instigated by W. F. Leonard, safety and insurance director of the Southland Corporation. Managers are asked to promote more safety meetings and safety clubs and off-the-job safety activity, by aiming safety materials, posters, data, letters to the homes of all employees. According to Mr. Leonard, a recent survey shows that many companies value this effort as contributing highly to their on-the-job safety programs.

Canning Plant Adds Refrigerating Space

NEW construction covering approximately 30,000 square feet of floor space is in the process of being built at the Stayton Canning Co. Coop., Stayton, Oregon. The building is of the tilt-up concrete wall construction with laminated beams and an 18-foot ceiling.

A section of the building, approximately 140 x 150 feet will house a new eight-foot continuous belt quick-freezing tunnel, 120 feet long. The balance of the room will be used for storing fresh carrots from the field, prior to processing. Additional cold storage space will be available in a section 65 x 80 feet providing a cold storage room for the finished product.

Refrigeration equipment to operate the new freezing tunnel and cold storage room, will be housed in a room 40 x 80 feet. Capacity of the engine room will be 800 horsepower. A transformer vault to house electrical transformers for power will be 16 x 26 feet.

Plant To Handle Fillets

THE Gordon Pew Company plans to build a $250,000 plant at Havre Auret, Magdalen Islands, Quebec, to handle frozen fish fillets. The Central Cooperative of island fishermen has decided to build a similar plant at L'Etangdu-Nord. The co-operative expects to receive financial help from the provincial government.

Electrical Safety Certification Proposed for Industrial Refrigeration and Air Conditioning Apparatus

EXPLORATORY discussions on the feasibility of certifying heavy electrical apparatus, large capacity distribution circuits and air conditioning systems, as meeting recognized safety standards for commercial and industrial buildings took place at the Chicago National Electrical Manufacturers Association Mid-winter Conference. Approximately 200 industry representatives participated in a closed session which concerned itself with custom built and other heavy electrical equipment which is neither labeled nor listed by Underwriters Laboratories, Inc.

NEMA representatives indicated to the press at a conference following, that no crisis existed in connection with certifying of such equipment. However, they explained that NEMA was not in the habit of waiting for a crisis to arise. The discussion was intended as a preliminary investigation into the need or requirement for such certification. Spokesmen for NEMA indicated some local inspectors had expressed to the Association that lack of certification placed additional responsibility on local code enforcement, by requiring them to pass on the adequacy of such equipment. At present there is no certification on equipment of 30 horsepower and up, or equipment utilizing 5,000 volts or better.

Discussion indicated that in addition to custom built equipment, other regular heavy electrical units under consideration were principally switchgear, followed in importance by transformers, capacitors, motors and generators. Decentralization of industry and commercial establishments with the resultant heavier demands on electrical distribution network facilities contributed to this discussion of safety precautions. This expansion into suburban or formerly rural areas, presents a difficult problem for electrical inspectors who are called upon to pass judgment on installations with which many have had little or no past experience, and for which no standards now exist.

According to NEMA spokesmen, concensus appears to be some form of certification which would assure the inspector (and owners, too) that the product design and manufacturing was in compliance with recognized safety standards thus providing him with a basis or criteria for his judgment. Representatives of the Association were of the opinion that a definite line of demarcation existed between appliances and light to medium equipment now certified by Underwriters Laboratories, Inc., and the heavy equipment considered in this discussion. It was believed that such a program would also eliminate the contention of some inspectors that a certain piece of equipment was manufactured by a firm unknown to him and therefore unacceptable.

Findings of this discussion session (both pro and con) were to be presented to NEMA joint Sections meeting and in turn to the Committee on Codes and Standards. No definite conclusions were drawn from the discussions, and NEMA representatives believe that it would be many months before any definite plan would be evolved.

Illinois Ice Company Completes Modern Package Ice Program

THE GLENN Ice & Fuel Company of Beardstown, Illinois, opening its 43rd year in the ice business, announced the completion of its packaged ice modernization program.

John H. Glenn, president of the company, said, "We recognize the tremendous changes which have occurred in the ice business. In order to provide today's consumer with ice in an attractive package at a reasonable price and, at the same time, service a wide variety of industrial accounts, we have found it necessary to revise our production facilities and marketing methods."

As one of Central Illinois' largest ice manufacturers having a capacity of 100 tons daily at its plant in the heart of the Spoon River Country, it distributes ice over a wide area in parts of Illinois, Iowa and Missouri. Since 1946 the Glenn ice plant has been completely automatic. At that time flooded ice tank coils with automatic ammonia floats were installed.

Power and Gravity Conveyors

Last year the company installed power and gravity conveyors and semi-live skids (pallets) to facilitate the handling and storing of packaged crushed ice and cubes. This year additional power conveyors have been installed along with a crusher block feeder, an automatic bag filler and two portable sewing machine type closers. These have resulted in faster ice packaging as well as a package which has more appeal to the consumer. In addition, the physical burden on employees has been reduced. In 1955, the Company successfully stored 6,000 bags of Glenn Certified ice cubes for a period of four months. During the month of March, 1956, 20,000 bags of cubes were processed and stored.

The Glenn fleet of refrigerated trucks delivers packaged crushed ice and cubes to its 24 hour automatic ice vending stations and its ice-service dispensers in various areas in Illinois, Iowa and Missouri. These trucks are equipped with Kold-Hold plates, driven by power take-off units, while the trucks are operating over the road. Electric motors operate the Kold-Hold plates when the trucks are in the garage. To save time in handling and to conserve storage space, the refrigerated trucks are loaded late in the afternoon and are ready to roll when the drivers arrive for work in the morning.

These changes in production facilities have enabled the company to manufacture ice on a volume basis and to improve its year-around load factor. As a result, unit production cost has declined and prices have been kept in line with competitive levels.

Looking to the future, Glenn sees further opportunities ahead. "Technological advances and automation in industry are bringing increased leisure time and a demand for more extensive recreational facilities on the part of consumers. This will provide us with an improved market for packaged ice if we can make it available in a convenient and attractive form and at a reasonable price. We are adding new vending stations each year to accommodate this increasing market. We are also aggressively merchandizing packaged charcoal briquets and packaged ice cream salt through our various ice outlets. This will bring us additional traffic and improve our profits."

Advertising

A dynamic advertising campaign is under way. Attractive company bulletins are issued to Glenn ice outlets and cooperative newspaper advertising, radio and T. V. spots are used to stimulate sales. Glenn book matches are distributed through cigarette vending machines.

The cooperation of employees is an essential ingredient of this bold new program. A progressive personnel program has been instituted. Employees have been encouraged to become "salesmen" for the company in their many contacts with friends, customers and the general public. Employees know that continuation of and improvement in the benefits they receive depends upon the success of the company. They must be sold on the program too.

The Glenn Ice & Fuel Company believes there is a great future in the ice business. Opportunities are there if we only take advantage of them and use modern techniques and know-how, he says.

Ice Plant Destroyed

FIRE destroyed the three-story frame plant of the City Ice & Fuel Co., Painesville, Ohio. The owner, Joe Schwartz, estimated the loss at $85,000. Firemen from four communities brought the fire under control in about three hours.

National Ice Coffee Promotion

SPEARHEADED by a special Pan-American Coffee Bureau advertising campaign, America's coffee industry is planning a full-scale drive this summer to increase consumption of ice coffee.

"Cool off with Ice Coffee" began on the Memorial Day weekend, and will continue through the summer with the Coffee Bureau and the individual coffee companies cooperating. The first big splash of promotion will come from a 3-page, 4-color gatefold advertisement in the Saturday Evening Post. This will be followed during June with a full page, in color, in American Weekly and similar space in Look. Further consumer advertising in major media is planned for July and August.

The decision to devote major summer attention to iced coffee resulted from the increasing popularity of iced coffee as a summer beverage, and the desire of the coffee industry to shoot up sales during what has previously been a slack selling season. To back up national advertising of iced coffee, the Pan-American Coffee Bureau and individual coffee companies are now preparing point-of-sale and store displays. In all, 23,500 retail stores will be given an opportunity to cooperate.

Increased consumption of iced coffee means increased use of Ice "Ice News" of the National Association of Ice Industries points out. Ice companies which have an opportunity to tie in with a coffee company in their area on this campaign should not miss it!

Polyethylene Box Liners For Yellow Newtown Apples

USE of film liners to effect change of atmosphere in apple and pear boxes during storage has shown advantage for some varieties. A. Lloyd Ryall, USDA at Fresno, Calif., has reported a season's study on Yellow Newtown apples, an important variety in the Pajaro Valley near Salinas, Calif. The year's work indicates that use of sealed polyethylene (150 gauge) at 40 F may be beneficial for this variety. At present, it is stored at 37 F, a compromise between 42 F which controls internal browning, and 31 F which delays ripening but results in severe internal browning. In Ryall's tests, all lots at 31 F browned internally. Those held at 40 F in polyethylene remained greener and firmer and developed less scald than others.—TRRF Information Bulletin.

Engineers Discuss Recent Developments In Air Conditioning Equipment

A PART of the Annual ASRE meeting held at Cincinnati June 3-6 was given over to an air conditioning conference, at which latest developments were discussed. Abstracts of the talks and papers follow.

Packaged Units or Central Plants for Larger Buildings

F. C. WOOD
York Corp. Atlanta, Ga.

EVOLUTION of air conditioning from the all central station plant in the early days to present day acceptance, in many instances, of packaged equipment for the larger buildings was traced. How the "Packaged" unit came upon the scene in 1937, and why was brought out; also how it encouraged the growth of the mass market by bringing air conditioning economically within consumer reach, in a convenient package, and simple to install.

Packaged units and the four basic types of central plants are defined and selection criteria for both types of systems are analyzed. Tons capacity is a poor yardstick although one authoritative group concluded that the central plant system is best above 100 tons capacity. The packaged system has the economic advantage of adaptability to a "step program" of conditioning and provides maximum continuity of capacity in the face of partial shutdown for repairs. It generally can be more quickly installed, initial cost is usually lower, ducts are smaller, hence less conspicuous, and requires less auxiliary horsepower.

The central plant by deliberate design, is better able to produce the ultimate in comfort, provide better air filtering and operates at a lower noise level. It provides more comfortable winter heating, is more flexible in adaptation to new buildings, has longer useful life, less and easier maintenance, simple and less disturbing-to-occupants operating supervision.

In summary: The Central plant is best applicable for new buildings above 100 to 150 tons capacity, or existing buildings where possible income justifies a long term investment, for year 'round air conditioning, and for more permanent type of installation. The packaged equipment system is best applicable for buildings of medium tonnage, for step-program air conditioning where equipment is owned by tenant on short lease, and where it is physically the most practical system.

Application of Air-Cooled Condensing Equipment

M. D. Irwin
Carrier Corp.

WITH the advent of air-cooled heat rejection in the packaged, air conditioning field, a myriad of problems descended upon those who design, sell, install, and service this equipment. Since the equipment can be designed in any of three basic arrangements, these problems can and do become quite broad in nature. In the case of integral air-cooled air conditioners, either commercial or residential, it is of course necessary either to locate the unit in or adjoining an adequate supply of outside air or to provide supply and discharge ducts for the air, adequately insulated and sound proofed. In the other two arrangements, either a self-contained unit is coupled with a remote air-cooled condenser, or a fan coil unit is located within the space and coupled with a remote condensing unit.

In either case, the packaged air-conditioning dealer finds himself to a degree in the applied refrigeration field. It is the responsibility of the design engineer and the application and service engineer to do as much of the planning as is possible, so that this equipment can be easily and safely applied and installed so that maximum user satisfaction will result.

Problems Discussed

Several problems were discussed including:

(1) Installation guidance based on experience to date, particularly as related to the handling of dynamic lines.

(2) The control of head pressure, both under high outside air conditions and thus required for its load limiting aspects, and under low outside air conditions with an unrelated internal load, being required for adequate system performance.

(3) The problem of refrigerant charge migration resulting from low sweeps in outside ambient temperatures and its effect on crank case dilution, operational start ups, and methods to safeguard against effects therefrom.

(4) Air cool design conditions and limitations applied thereto.

(5) Capacity variation, its effect on equipment selection, operating cost, etc.

Condensing Surface For Air Cooled Equipment

JUSTIN NEUHOFF
General Electric Co.

WHEN self-contained air conditioners were first sold in the late 1930's practically all of them were water cooled. Few enough were made that seldom did a community have enough saturation to make an appreciable dent on the water supply. Water cooled units were less expensive to build and usually less expensive to operate so there were no pressures on the manufacturers to design anything else. As water became increasingly scarce, the first move was to go to the use of cooling towers. This let the manufacturers continue to build only one kind of unit, but most of them did recognize the increasing use of cooling towers and offered either special condensers or condensers so circuited that water passages could be circuited in series for city water or in parallel for cooling tower use. Another straw in the wind was the dropping of the water regulating valve as a standard part of the unit, making it an accessory.

The cooling tower was not the whole answer. It had several problems, which included the ever present one of corrosion of the cooling tower itself and the liming of the condenser, since few of the cooling towers were treated to prevent scaling. Another possibility investigated by a few manufacturers, and still not completely ruled out, is the type of water saving device which circulates the condenser water in a finned coil over which outside air is blown. This device has the advantages of using a closed water circuit so there is no scaling problem and permits the manufacturer to build only a water cooled unit, but must use the dry bulb temperature instead of the wet bulb temperature, and so is at some disadvantage temperature wise with respect to the cooling tower.

Air Cooled Condensers

Air cooled condensers solve some of the problems but introduce a few of their own. The problems of corrosion and scaling inherent with the cooling tower are eliminated. No pump is required to circulate water. But the cooling tower's advantage of being able to use wet bulb temperature is lost too. Where the air cooled unit can be made as a self-contained device the problem is fairly straightforward and simple. But where the condenser and evaporator are remote from each other there is a problem of running refrigerant piping. This is troublesome because as the industry has expanded there have been fewer skilled installation mechanics available per unit installed. And adding to the problem is the fact that it is more important than ever that this installation be done properly, now that we are almost universally using hermetic compressors, since the hermetic compressor is sensitive to the presence of moisture and other contaminants which can be easily introduced into the system at installation, unless suitable precautions are taken.

Manufacturers designing lines of self-contained air conditioners with air cooled condensers have a different problem from that which existed in the past for air cooled commercial refrigeration. In the latter the equipment was generally located in a cellar or a back room and the quantities of heat to be rejected was relatively small. The packaged air conditioner is trying to cool the space and not just a commercial box, so it must reject the heat out-of-doors. This means the condenser can be located on the ground but more likely will be on the roof. Most companies have designed their condensers to operate at outdoor temperatures up to 115 F recognizing that even though design temperatures are considerably lower, unusual conditions such as stagnant air require a little extra safety factor.

A survey of the design practices of seven of the larger companies in the self-contained air conditioner business showed considerable divergence of opinion concerning many of the design parameters. All companies are using copper tubing and aluminum fins for their condensers but from this point of agreement the individual design of each of the companies showed considerable variation. For example, the number of rows deep varied from 2 to 6. The cfm of condenser air per ton of air conditioning varied from 615 to 1,170 with a median of 900. Air face velocity was from 280 to 605 ft. per min. with a median of 455. The actual square feet of surface per ton ran from 124 to 222 with median of 151.

Most of the units balance out at around 125 F condensing temperature when the air supplied to the condenser was 95 F, but there was still a variation of from 117 to 130 F in the range. Condenser fan kw, which can be an important part of the total operating cost, was reasonably consistent around a median of 0.16 kw per ton. One unit, however, was reported as drawing twice that power.

It would seem that the industry is far from being ready to accept any standard figures for cfm per ton, face velocities or total surface, since depending upon the design, any of these figures can be varied. The most efficient air cooled condenser, considering all factors such as air flow, initial cost, and noise level, has yet to be designed.

Modern Refrigerated Storage Provided By Port of New York

THE PORT of New York and its vast facilities service the world's greatest market place according to a feature article in the New York Journal of Commerce. The accomplishment of this enormous task day in and day out is a phenomenon of such size and complexity that the bare statistics stagger the imagination. However, trying to visualize this picture in terms of carloads, tons, number of ship arrivals, cubic feet of storage space, miles of highway, dollars invested, etc., can sometimes obscure rather than reveal the intricate operations of what is truly the greatest show on earth.

The cold storage warehouse industry is only one of hundreds of services available in the Port of New York, but is one without which this whole project could not continue to function. Perhaps 80 percent of all the food consumed in the metropolitan area is of a perishable nature, and most of this has passed through a cold storage warehouse somewhere along the chain between producer and consumer. The use of perishable foods in particular is increasing dramatically year by year.

The modern housewife in a metropolitan area is becoming more and more attracted to quality foods with built-in convenience of preparation. Hotels, restaurants, steamship lines and institutions find that the saving in labor plus uniformity of product and well designed packages are compelling reasons for switching to frozen and perishable products.

Services Provided

To meet this continually rising demand, the cold storage warehouses of the Port of New York perform two principal functions. First, they carry out the traditional role of serving as custodian of surplus food production accumulated during season of plenty to be consumed over periods of nonproduction. This assures families in the metropolitan area of high quality perishable foods on a year-round basis at a relatively stable price level. To the producer whether he be a farmer, packer or processor, the availability of this reservoir is protection against low prices which would result from dumping surpluses on a market during peak seasons of production.

The second principal function of the cold storage warehouses of the Port of New York is to serve as a center of operations for distribution. The problem of distribution is not a new one, but in recent years it has called for intensive study, since it is taking a larger percentage of the consumer dollar. The cold storage warehouse is recognized as the logical hub of perishable food distribution, because it is economical and because it is efficient. From it the importer, the distributor, the chain store, the packer all operate.

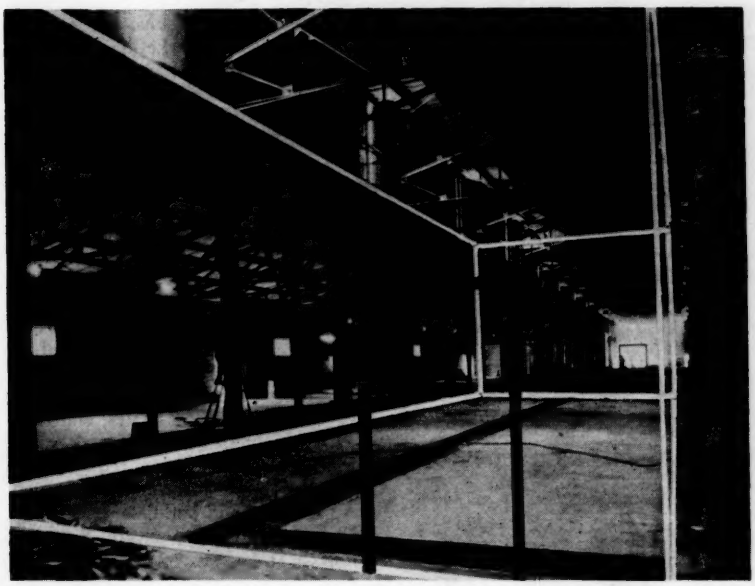
Modern materials handling reduces their costs, services of all kinds from stencilling boxes to bonded storage are available, and financing of inventories is easily arranged. And yet the cost per pound of product of taking advantage of these services is fractional.

The fact that the port warehouses are able to offer these numerous services so economically means that the storer need not tie up his own funds in creating facilities required to protect and distribute his products. Instead his money can be devoted to production and merchandising.

In addition to the functions already mentioned, it might be noted that the cold storage warehouses of the Port of New York are a vital part of the local defense picture. Should an emergency occur, the cold storages, which in general are buildings of heavy reinforced, fireproof construction would be called upon to feed a tremendous population under extremely trying conditions.

Winery Expands – Adds to Capacity

FROM steel foundry to winery could be a cryptic description of the alteration and remodeling efforts of the Mogen David Wine Corporation in connection with their present expansion operations in Chicago. This winery announced last fall its plan to increase production capacity by 300 percent and addition of two new wines to its present line of products.



White Outline indicates size of refrigerated room under construction at Mogen David for wine process storage. Fiberglas and steel materials used.

The company took over by purchase, a former plant of the Chicago Steel Foundry Company which it is remodeling for a new fermentation, filterization, and pasteurization plant. Included in the new plant is a 60,000 gallon blending tank room, sugar handling and heating equipment in addition to that required for the previous operations mentioned. According to the present plans, aging, bottling and shipping operations will be continued in Mogen David's present plant some 2,000 feet away from the new installation.

In altering the foundry for its purposes, Mogen David has used the old building foundation and footings, and part of the existing masonry structure. Practically the entire steel structure as used by the foundry has been retained. Remodeling has added additional masonry as needed. A precast insulating concrete type roof deck has replaced the old steel roof. Prefabricated galvanized steel panels have replaced corrugated iron curtain walls. The entire plant is 600 ft. long by 100 ft. wide and 26 ft. 6 in. under the center span trusses. The tank room will be 36 ft wide by 101 ft. long by 26 ft. high. It will contain 11 tanks approixmately 14 ft. in diameter by 20 ft. high. Access to the insulated tank room will be through two Jamison Cold Storage Doors.

Insulation of the tank room is with Owens Corning Fiberglas Corp. AE-board for the walls and ceiling. Fiberglas AEF-board will be used for the floor. Total insulation thickness will be 5 inches applied in two layer construction. The insulation will be supported in the walls by angles welded horizontally to the old foundry steel structure at approximately 8 foot levels. Ceiling insulation will be suspended from T-bars supported by angles welded between the steel building trusses. Contractor for the insulation, cold storage doors and supporting materials is Industrial Cork Co., Chicago.

Refrigeration of the plant involves two separate systems. One application is to the tank room for fermentation control. The other system is for wine chilling or cooling. Refrigeration for the wine storage cooler or tank room involves a 12-ton system, which utilizes a 6 x 6 Frick VSA twin cylinder compressor V-belt driven from a 25 hp motor.

The wine chilling or cooling system for post-filterization and post-pasteurization utilizes two 9 x 9 Frick VSA twin cylinder compressors, each driven by 100 hp motor. This system is rated at 72 tons refrigerating capacity. The fermentation control system is rated at 12 tons.

Condensing is by means of Midwest Engineering Equipment Company "Aerial" condenser which is the atmospheric spray type with automatic winter and summer operation features. Midwest, the refrigeration contractor, will provide four Krack ceiling hung diffuser type units in the tank room. These units will be electrically defrosted. The wine chiller is a stainless steel unit by Mojonnier Bros. Both refrigeration systems are described as completely automatic in operation.

Ice on Television

THE Iceman's story is being told on television by Mildred Nichols, Secretary of The Georgia Ice Manufacturers Association. During June she was invited by one of the Atlanta TV stations to do a show on making home-made ice cream and using it in fancy dishes. As would be expected, she did a superb job for ice cream — the home-made variety, that is. But she also did an equally fine job for Ice. How could you make good home-made Ice cream without Iceman's Ice anyway?

The next television show over the same station featured Ice carving. The local carver turned out a glistening masterpiece from a 300-pound block of Ice before a TV audience. The reception was great and the carving was placed in cold storage to add elegance to another TV food show for ten days later.

Bakery Refrigeration Extends to New Zealand

NOTED in the president's report of 1956 for the New Zealand Institute of Refrigeration Engineers, was a comment on the use of refrigeration adopted in New Zealand this year. J. L. Gichard, president of the institute, says the application was to their old friend "The Hot Cross Bun". According to his report, large quantities of these are usually in demand at Easter in line with traditional custom. It was found impossible to meet the demands and to carry on the usual work of the bakery, so the buns were made, baked, packed and frozen beforehand and were ready for issue at Easter. No comments adverse to the procedure have been noted according to Gichard.

Survey of Refrigerated Warehouse Space Shows Increase

GROSS REFRIGERATED WAREHOUSE CAPACITY, OCTOBER 1, 1955

Type of warehouse	0 F. or below	Above 0 F. to 50 F.	Total	Percentage change since 1953
	Million cu. ft.	Million cu. ft.	Million cu. ft.	Pct.
Public	282	216	498	+ 7
Private & semiprivate ..	74	172	246	+21
Meat packing	21	48	69	−13
U. S. Total	377	436	813	+ 9

TOTAL REFRIGERATED STORAGE CAPACITY, UNITED STATES, OCTOBER 1, 1955

State	Gross Space 0° F. or below	Above 0° F. to 50°F.	Total
	1,000 cu. ft.	1,000 cu. ft.	1,000 cu. ft.
Maine	2,213	692	2,905
New Hampshire	60	493	553
Vermont	374	875	1,249
Massachusetts	16,435	9,288	25,723
Rhode Island	1,197	482	1,679
Connecticut	537	3,240	3,777
New York	31,688	57,857	89,545
New Jersey	16,631	13,037	29,668
Pennsylvania	15,061	18,446	33,507
Ohio	10,768	10,822	21,590
Indiana	3,731	2,078	5,809
Illinois	36,111	32,073	68,184
Michigan	9,002	20,926	29,928
Wisconsin	5,132	16,830	21,962
Minnesota	13,981	3,205	17,186
Iowa	9,259	5,343	14,602
Missouri	13,837	14,032	27,869
North Dakota	420	263	683
South Dakota	508	4,039	4,547
Nebraska	9,390	5,108	14,498
Kansas	10,087	14,712	24,799
Delaware	753	626	1,379
Maryland & District of Columbia	7,879	2,567	10,446
Virginia	4,770	23,479	28,249
West Virginia	1,008	4,738	5,746
North Carolina	1,330	1,477	2,807
South Carolina	592	314	906
Georgia	3,839	7,522	11,361
Florida	31,926	2,682	34,608
Kentucky	1,568	1,836	3,404
Tennessee	7,054	3,845	10,899
Alabama	1,459	751	2,210
Mississippi	116	644	760
Arkansas	1,036	538	1,574
Louisiana	3,712	1,135	4,847
Oklahoma	2,927	2,952	5,879
Texas	12,725	10,117	22,842
Montana	238	290	528
Idaho & Wyoming	2,130	1,098	3,228
Colorado	3,322	1,896	5,218
New Mexico	183	90	273
Arizona	656	174	830
Utah & Nevada	1,976	928	2,904
Washington	21,001	74,555	95,556
Oregon	13,893	13,590	27,483
California	43,986	44,831	88,817
United States	376,501	436,516	813,017

REFRIGERATED cold storage warehouses in the United States had a gross capacity of 813 million cubic feet on October 1, 1955, according to preliminary results of the 18th biennial survey by the U. S. Department of Agriculture. Approximately 377 million cubic feet of space could hold temperatures of 0 F. or below; the remaining 436 million cubic feet could hold only temperatures above 0 F.

The survey, made by USDA's Agricultural Marketing Service, shows that since 1953 warehouse capacity has increased by 65 million cubic feet. Capacity gains were reported in all geographic areas but were chiefly in the Pacific, South Atlantic, and West North Central regions.

The following table gives a preliminary summary of the 18th biennial survey. Refrigerated storage facilities are defined as warehouses artificially cooled to 50 F. or lower in which food products are generlly stored for 30 days or more.

A final report giving warehouse capacity by regions, States, and cities will be issued later in the year and will be available upon request from the Marketing Information Division, Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.

Refrigeration Association Of Spain to Hold Meeting

THE first meeting of the Refrigeration Experimental Center of Spain will be held at Madrid November 5-10, 1956. A report of the work accomplished will be presented, and a series of visits to the more important refrigeration installations in Madrid will be made. Any communications that may be submitted will be presented for discussion, subject to the time available.

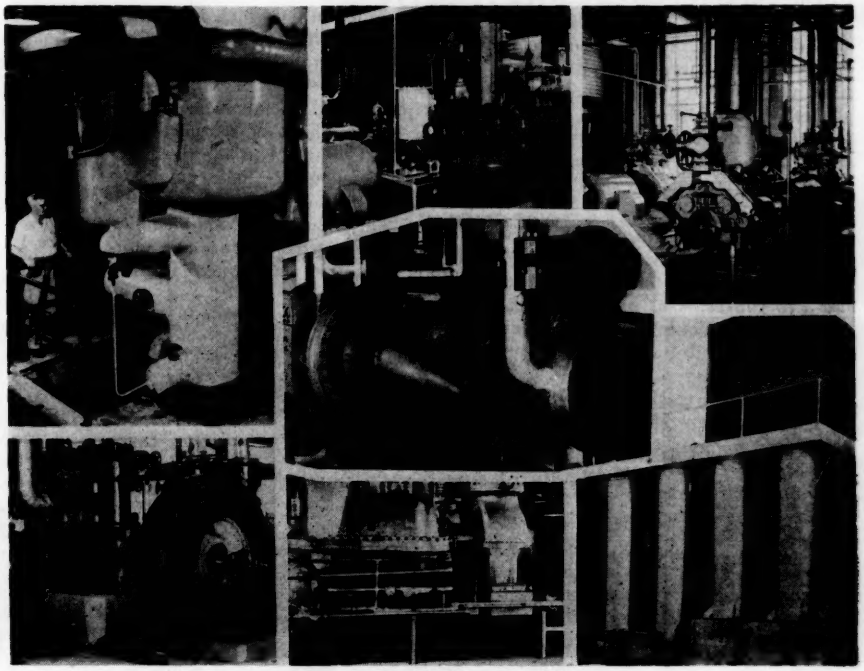
New Apple Storage House

PLANS have been made to rebuild a fruit packing plant of Pyramid Orchards, Yakima, Wash., which was destroyed by fire recently. The new warehouse will cost about $300,000. It will be of one-story construction with the latest in refrigeration and fork lift trucks, 270 x 200 feet. Storage capacity will be 280,000 boxes, about the same as the former building. Construction will be of reinforced concrete and laminated wood.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Engine Room Practices and Procedures in the



"This is the Heart of your Plant"

Prevention of REFRIGERATING PLANT FAILURES

HEART of the refrigerated enterprise, whether it is cold storage, ice manufacturing, central station air conditioning, milk or ice cream production, beverage making or metallurgy applications, is the refrigerating plant and its operating personnel. Other departments like management, sales, production, accounting, traffic, laboratory, etc., are the mind, senses, arms and legs that with the heart make up the whole body of the enterprise.

EXECUTIVE OFFICE NAPRE
433 N. Waller Ave.,
Chicago 44, Ill.
OFFICERS
President: Leroy Etzel
San Francisco, Calif.
Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

BERT C. McKENNA
Vice President, NAPRE

Personnel, their safety, operation and maintenance practices are four factors most important to healthy well regulated Engine Room operation. Procedures followed in executing these practices contribute to the economic well-being of the enterprise.

Unseasonal shut-downs due to lack of maintenance detract from economic health of a refrigerating industry the same as in any other business. Active and accurate machinery history and maintenance records assure the most reasonable preventive measures. Operation efficiency is not only dependent on simplified and useful logs, reviewed periodically, but also on unique practices brought about by local conditions, such as scheduled shutdowns due to curtailed power periods.

Safety is another contributing factor in operating and maintenance efficiency. Personnel relations within the Engine Room family and with other department relatives, contribute to continued safety, efficiency and overall welfare of any refrigerated enterprise.

Regular habits or customs (*Practices*) are necessary to the well regulated plant. Such customs apply to all four factors of maintenance, operating, safety and personnel. Such habits are not established by engi-

Bert McKenna, first Vice-president, NAPRE, is chief engineer of Central Cold Storage Co.'s four plants at Chicago, Ill. Formerly in a similar position at San Francisco with a large dairy chain, and an experienced brewery and slaughterhouse engineer, he has always been an active promoter of practical engineering instruction for his own engineer personnel and NAPRE members. This presentation by McKenna (second in a series of six by NAPRE) in its original version, was given before the TRRF-NARW Management Training Conference at Purdue University, Jan. 1956.

neering alone, but by management, engineers and other departments together.

With a complete understanding of each other's functions, all cooperate to establish maintenance and operating practices. A little less involved as far as the entire enterprise is concerned, are safety and personnel practices within the engineering spaces. But to more than just a limited extent are understanding and cooperation between departments again important to these latter two factors.

Work routines or processes to be followed in executing established practices could be termed engineering *Procedures*. The practical man, and possibly management, too, has difficulty separating *Procedures* from *Practices*. However, when methods of operating or maintaining equipment between several different plants or different engineering staffs are compared, *procedures* are readily apparent. Table I should help differentiate between them.

Maintenance Top Factor

Much has been written about maintenance. Various writers and scores of engineers will differ as to what is *routine*, *preventive* or *productive* maintenance, and which is applicable in what plant. However, all will agree that in todays so-called automatic plants this factor has top consideration.

Routine or periodic maintenance could be termed "minimum". In other words, a practice set up whereby the least amount of maintenance is followed based upon manufacturer's recommendations for inspection and overhaul. Overhaul, for example is usually performed under this type of maintenance only after equipment has accumulated maximum number of hours operation which the manufacturer prescribes as requiring shutdown and thorough inspection, and possible replacement of major wearing parts. Superficial inspection is made as an operating routine. More detailed inspection is made by maintenance personnel as they can get to the equipment. This program is usually followed where maintenance and operating personnel are at a minimum and often inadequate for the plant needs.

This type of maintenance or operating program is to be discouraged, as it has a tendency to prolong the operating periods beyond the manufacturer's recommendations before the equipment is inspected, serviced or overhauled. The next step in a program of this nature is to run the equipment to death and then replace it. This is a poor engineering practice from the standpoint of business economy, safety and personnel aspects.

Preventive is the term used to describe maintenance programs used mostly today. Such maintenance practices require a systematic program of inspection and service, with regularly scheduled overhauled periods. This involves a planning and publication of schedules or routines for employees to follow in their inspection and service work. It also means the preparation and execution of an overhaul calendar.

Productive maintenance has through the efforts of some of our large electrical machinery manufacturers become a more popluar term used in connection with maintenance. However, it is a needed practice, especially in critical refrigeration applications such as the seasonal enterprises of fruit and vegetable freezing. Productive maintenance requires the same inspection and service routines as can be found in a preventive system, but at closer intervals of time on particular pieces of equipment especially when such units are under critical operation.

Rather than involve an overhaul calendar, the productive maintenance program involves the use of standby equipment or critical spare parts for production or process equipment failure which would cause a plant to be out of operation should they fail. Such a practice usually involves a program of standardization of equipment and interchangeability of spare parts to a greater extent than is normally found in the average refrigeration plant. It also involves a seasonal employment of skilled maintenance personnel at peak production periods.

Maintenance Requirements From Instruction Booklets

Periodic inspection of equipment must be determined from the manufacturer's recommendations and the actual operating requirements of the plant. Some inspections like feeling journal bearings on large rotating equipment in some instances are made every hour. Other types or makes of equipment and their age will involve half hourly or every-other-hour inspection. Some equipment used rarely might only require inspection at the time of its use.

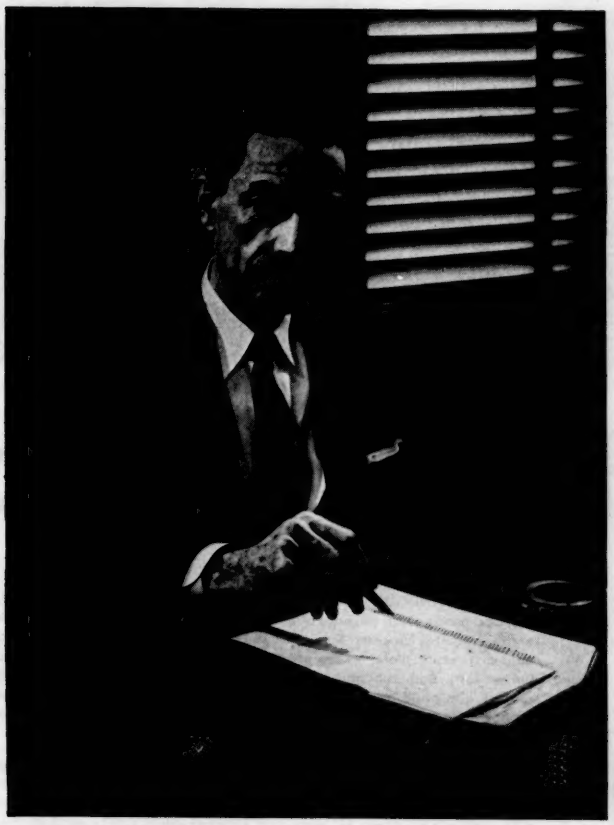
Service with regard to lubrication, adjustments to flow equipment, speed control, etc., might be made only daily in connection with some other items of machinery in the engine room plant or under the engineer's jurisdiction. Inspection and service under still other conditions may not warrant a check by the operator or maintenance man other than weekly, semi-monthly, monthly or semi-yearly.

Whatever the pattern developed for inspection, records should be kept of the inspections made. Inspection made frequently during a watch or during the day should be entered or noted on the engineering log. Where inspection or service is less frequent, it should suffice to keep such data on a maintenance record card. These maintenance record cards should serve as supplemental information to

TABLE I—SAMPLE ENGINE ROOM PRACTICES AND PROCEDURES FOLLOWED IN SUCCESSFUL ADMINISTRATION OF REFRIGERATING PLANTS. DISTINGUISHING PRACTICE FROM PROCEDURE

Program	Practices	Procedures
Maintenance	Annual Overhaul	Schedule for "Off-season" with Management
		Start with critical machinery
		Line-up outside work
		Have parts on hand
		Have Personnel on hand
	Periodic Inspection	Schedule some Daily
		Weekly
		Semi-Monthly
		Monthly
		Semi-Yearly
		Use composite maintenance crew
		For permanent records use
		Machinery history and
		maintenance record cards
Operating	Engine Room Routine	Entries logged
		Each shift) Fuel and water
		) Electrical KWH Demand
		) Steam
		Every 2 hours Temperature Pressure
	Peak Power Shutdowns (4:30 to 7:30 p.m. daily)	Shutdown all non-emergency power
		Avoids exceeding established peak
		during penalty period.
		Used as change-over period
		Used for emergency repair periods

Take a tip from those who know refrigeration best!



"Use only high purity Ammonia in your refrigeration systems"

"We approve the use of ammonia only in purities greater than 99.95% for charging both new and old refrigeration systems.

"Our reasons for this are: to exclude foreign organic materials such as oily or gaseous contaminants which can contribute to the breakdown of compressor lubricating oil; also to exclude moisture as completely as possible from refrigeration systems in order to prevent extensive corrosion, sludge formation and damage to wearing parts.

"For these reasons we charge our systems only with high purity ammonia which is as dry and free of contaminants as is possible to obtain."

R. L. Beach

(R. L. Beach)
Service Manager,
Industrial Division
YORK CORPORATION

All leading manufacturers of refrigeration systems recommend the use of high purity ammonia. And many of them depend on Armour to supply their needs. They know Armour ammonia is consistently 99.98% pure, extremely dry and free of all oil and non-condensable gases.

They're also sure of a dependable source of supply and prompt service since Armour maintains offices in 121 cities. If you're interested in this source for high purity ammonia either write us or mail the coupon below.

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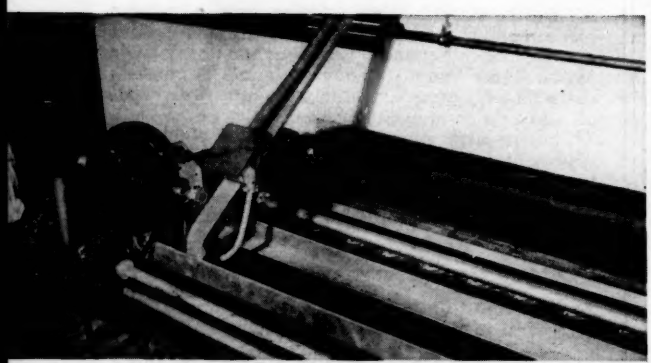
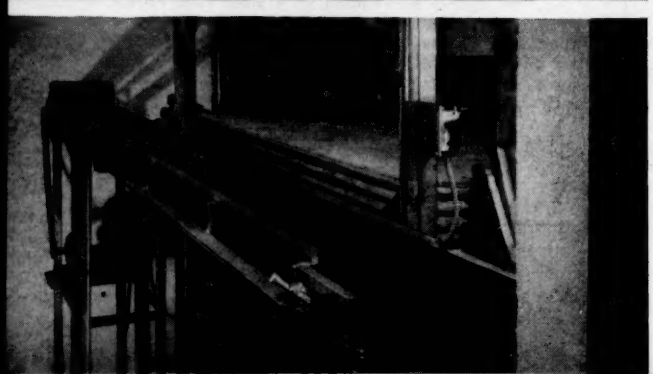
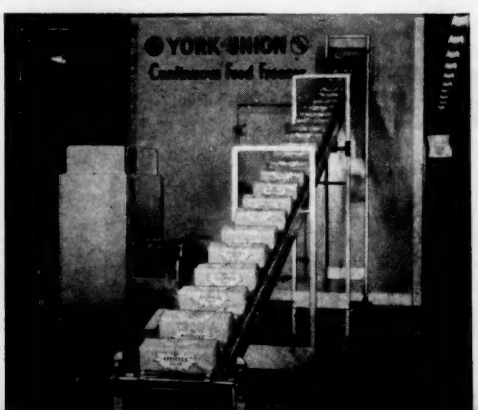
THE BIG ADVANCE IN FOOD:





YORK CONTINUOUS PACKAGE FREEZER (left) automatically loads and unloads rectangular packages in volume. A single operator controls the entire freezing process. Automatic loader pushes each row of packages onto a freezing plate, where product begins freezing instantly on contact (upper left). Both top and bottom surfaces of packages are in intimate contact with plate and freezing is uninterrupted by loading of additional product. When filled, machine ejects row of frozen product for each new row of product loaded (lower left).

YORK-UNION CONTINUOUS FOOD FREEZER (below) handles varied products at high speeds, automatically. Amazingly versatile, this York-Union Continuous Food Freezer can freeze thousands of food packages an hour. A typical unit 60' long, 14' wide and 11' high could freeze each of these quantities in an hour: 3720 half gallons of ice cream; 3560 loaves of bread; 2390 whole 2¼ pound chickens. A uniform temperature of −30° F. or lower can be maintained.



CONTINUOUS FREEZING BY YORK

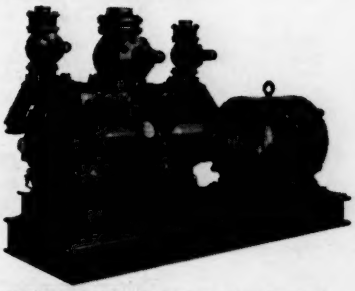
Two new versatile York freezing systems are completely automatic, make possible important economies in frozen food handling.

Automatic, high speed *continuous* food freezers are now a reality, thanks to York leadership in refrigerating equipment.

This is exciting news, not only for food processors, but for the housewife who buys food for her family. It can mean frozen foods in greater variety, at greater savings. Formerly, fresh foods had to be stacked on trucks by hand, pushed by hand into the freezer, and unloaded by hand. But York's new automated procedures will speed and simplify handling.

York designed one of these new freezers especially for large, bulky foods or odd-shaped packages. The other is for small, rectangular packages of uniform size, and can adapt itself to packages of different sizes as required by various runs.

For more information on these new freezers call your nearest York district office. The telephone number is listed in your Classified Directory under "Refrigeration Equipment".



HEART of any York freezing system is a York compressor. Above is a 3¾"x3" VW, one of many different types of York compressors.

York refrigeration air conditioning

the quality name in freezing

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

the machinery history index cards in the engineers office (See Figs 1 and 2). A duplicate set of the machinery history cards with the latest detailed maintenance record card should be kept in the main office or another safe location away from the engine room plant itself.

In larger plants where inspection, service, and annual overhaul runs into a good amount of man-hours, the engineer personnel budget should provide for adequate maintenance personnel to stay a jump or two ahead of the requirements of all machinery. In the larger plant, a composite maintenance crew is most desirable. For example, in a 4-plant cold storage operation involving four multi-storied buildings with 16 freight elevators and a total of one thousand tons of refrigeration supplied to the cold storage spaces by a brine system, a maintenance force of six mechanics may just be adequate. This maintenance force would ideally consist of a foreman, welder, machinist, electrician, electrician's helper and maintenance apprentice. Experience has shown that in an operation of this size, even with a maintenance force of six or more, it often requires an outside contractor to be called in to take charge of heavier repairs or alterations.

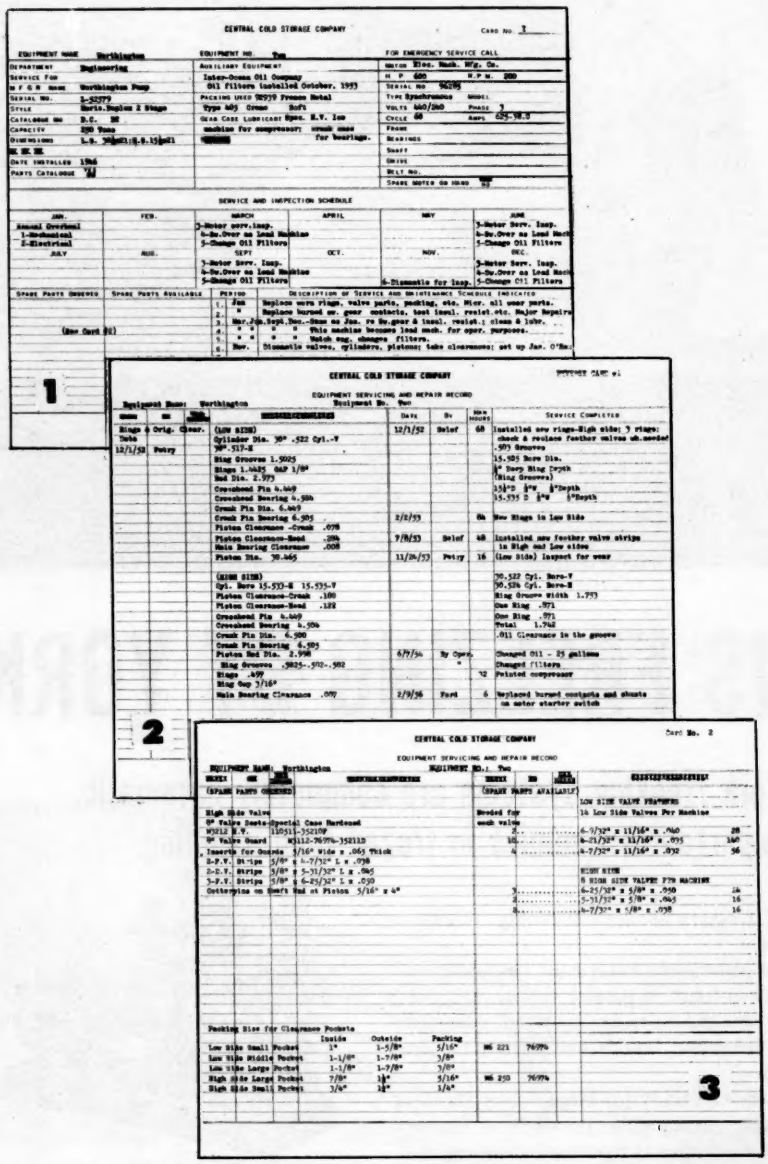


Fig. 1 — Machinery History, Service and Inspection, and Repair Cards used at the author's firm. Card labeled "1" carries nameplate data, auxiliary and accessory information and nameplate information on prime-mover. Reverse side of this card (labeled "2") has service and repair entries (In this instance, author lists pertinent clearance data also for comparison purposes). Additional cards are used for Servicing and Repair records; also for long lists of parts ordered or on hand, as shown in card labeled "3", here. This card carries supplemental data on the accessories, like the clearance pocket packing size, type, etc.

Post Detailed Instructions

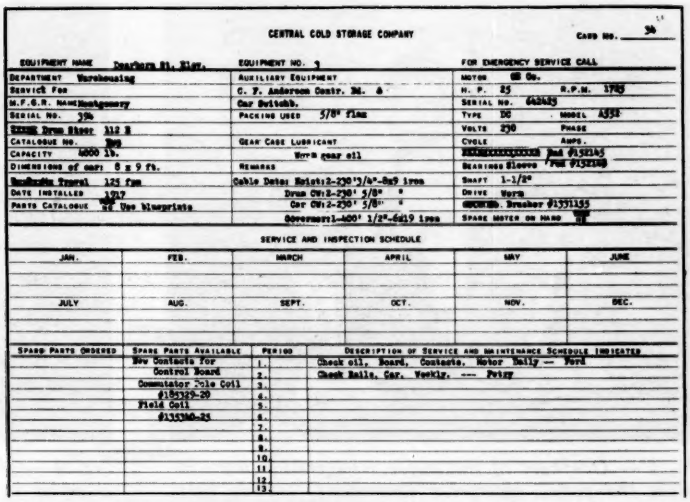
In addition to the paper work involved with inspection records, a certain amount of written work is involved in detailing inspection, service and repair work for both operating and maintenance personnel (See Instruction Charts 1 and 2). Certain pieces of apparatus which are serviced or inspected daily, every shift, or oftener should have posted near them or on the watch engineer's desk, standing inspection and services instructions.

Instruction Chart No. 1 —
Inspection of condenser water service pump.
Maintenance Engineer:
Daily
(1) Check packing glands.
(2) Check screens and clean if necessary.
(3) Check bearing temperatures
Electrician:
Daily — Check motor bearing temperatures.

Instruction Chart No. 2 —
Overhaul and service of condenser water service pump.
Maintenance Engineer:
Semi-annually
(1) Renew the packing if needed.
(2) Check the impeller for plugged vanes, for wear, etc.
(3) Lubricate the bearings, etc.
Electrician:
Semi-Annually
(1) Take insulation resistance readings on motor service, control circuits, armatures, field, etc.
(2) Check ground connections on the frame, frame to foundation, etc.
(3) Clean thoroughly, checking windings, insulation, etc. for insulation deterioration or breakdown.

Table 2 lists typical standing instructions[1]. A check-off list should be provided which the mechanic completes and turns in showing the work is accomplished, or provision should be made in the engine room log for such entries. Many manufacturers include with the instruction and parts books for their machinery, inspection and service charts which can be duplicated for the purposes mentioned. Many of them even provide check-off lists for this purpose. Many go further than that, providing booklets on the operation of the equipment. Summary of such operation should be posted also for the watch standers or personnel involved in the machinery operation.

For an example of helpful literature (which doesn't pertain to refrigerating machinery but would prove beneficial for maintenance personnel) is Bethlehem Steel Co.'s Elevator Ropes Booklet No. 149. The cold storage warehouse operator and the multi-story public building engineer will find this literature very helpful to his maintenance program for the data contained therein.



CENTRAL COLD STORAGE COMPANY

Card No. 36

EQUIPMENT NAME Dock Door Sl. Elev.	EQUIPMENT NO. 3	FOR EMERGENCY SERVICE CALL
DEPARTMENT Warehousing	AUXILIARY EQUIPMENT	MOTOR GE Co.
SERVICE For	C. F. Anderson Contr. No. 6	H. P. 25 R.P.M. 1745
M.F.G.R. NAME Montgomery		SERIAL NO. 642685
SERIAL NO. 35h	Car Switch.	TYPE DC MODEL A358
STYLE Drum Elevr 112 B	PACKING USED 5/8" flax	VOLTS 230 PHASE
CATALOGUE NO. Dwg	GEAR CASE LUBRICANT	CYCLE AMPS.
CAPACITY 4000 Lb.	Worm gear oil	[illegible] and #152145
DIMENSIONS of car: 8 x 9 ft.	REMARKS	BEARINGS Sleeve Pin #152210
Hoisting Travel 125 ft.	Cable Data: Hoist: 2-230'3/8"-6x9 Iwrc	SHAFT 1-1/2"
DATE INSTALLED 1917	Drum Cut: 2-230' 5/8" "	DRIVE Worm
PARTS CATALOGUE See Use blueprints	Car Cut: 2-230' 5/8" "	GROUND. Brushes #1371155
	Governor: 1-400' 1/2"-6x19 Iwrc	SPARE MOTOR ON HAND No

SERVICE AND INSPECTION SCHEDULE

JAN.	FEB.	MARCH	APRIL	MAY	JUNE
JULY	AUG.	SEPT.	OCT.	NOV.	DEC.

SPARE PARTS ORDERED	SPARE PARTS AVAILABLE	PERIOD	DESCRIPTION OF SERVICE AND MAINTENANCE SCHEDULE IMIGATED
	Rev Contacts for Control Board	1.	Check oil, Board, Contacts, Motor Daily — Ford
	Commutator Pole Coil #185329-20	2.	Check Rails, Car, Weekly. — Prior
	Field Coil #135340-25	3.	
		4.	
		5.	
		6.	
		7.	
		8.	
		9.	
		10.	
		11.	
		12.	
		13.	

Fig. 2 — Engineering Records are not limited to refrigeration machinery room equipment. In a cold storage plant, materials handling equipment is critical. Shown here is the machinery history card for an elevator. Service and inspection schedule involves daily measures with this apparatus. Cable data on this card, plus most used electrical parts, give engineer accessible information for immediate replacement.

Departmental Cooperation

Another important aspect to an efficient maintenance program is the annual overhaul practice. Engineering has gotten itself into more difficulty with management and other departments in the refrigerating enterprise by trying to rigidly adhere to an overhaul calendar of its own making. Refrigerating and other machinery is installed to serve the overall enterprise.

Annual periods for dismantling and inspection, and for major overhaul or repairs must be scheduled for "off-season" periods. The engineer who commands the respect of other departments and wins the admiration and cooperation of top management is the one who arranges his annual overhaul period with other department heads involved. Imagine the embarrassment of the engineer who had dismantled one of his major compressors only to learn that the sales department has just promoted a deal for the immediate freezing of from 300 to 400,000 pounds of meat!

Best practice is to take the overhaul calendar to top management and ask that other department heads involved be called in. Shut-down time and engineering problems should be frankly laid before them and their cooperation solicited. Fair play of

[1]See also "Good Maintenance and Operator Procedure In Cold Storage Plants, by Prof. H. P. Hayes and Jos. W. Sullivan, Page 79, 1953 NAPRE Operating Data Book, I. R. October, 1953.

TABLE II—TYPICAL STANDING MAINTENANCE ORDERS POSTED AROUND REFRIGERATING MACHINERY ROOMS

Frequency	Machinery Effected	Maintenance Task	Performed By
1. As needed	All pumps and compressors	Check packing glands and bearings	Operating engineer in engine room spaces; maintenance engineer outside engineer spaces
2. Daily or weekly as needed	Lubrication	All rotating equipment	Operating engineer in engine room spaces; maintenance engineer outside engineer spaces
3. Daily	Verticle shell & tube condensers outside the engine room spaces	Check condenser tubes for proper water flow and brush out accumulations of dirt or marine growth	Maintenance engineer
4. Daily	Brine system	Test ring the brine level alarms by hand	Maintenance engineer at roof tank; the operating engineer in the engine room
5. Weekly	Sprinkler system	Test the sprinkler system and test ring low pressure sprinkler alarm	Maintenance engineer
6. Daily	Elevator machinery rooms	Check all electrical and mechanical gear	Maintenance engineer and maintenance electrician
7. Weekly	Elevator shafts and cords	Check and test elevator rails, cables, doors and interlocks	Maintenance engineer and maintenance electrician
8. As needed	Brine system	Apply chemicals on order from the contract chem. lab.	Operating engineer
9. As needed	Refrigerator doors	Repair or replace hardware and gaskets	Maintenance engineer
10. As needed	Evaporators	Defrost	Operating engineer from the engine room spaces

Note: Item (1) may be performed several times during a shift. Instructions or operating routine is prescribed in standing shift orders or log book entries obtain the same results.

Item (10) defrosting is accomplished from the engine room as the hot brine defrost manifolds are located there. Warehouse supervision calls for heat as needed.

Fig. 3 — Overhaul of the major refrigeration units involves the entire enterprise. Downtime, outside help, parts replacement, and other such important matters must be discussed with top management, and other department heads. Pictured here are the warehouse superintendent, chief engineer and purchasing agent of a large midwest plant, discussing the installation of a new large pump for condenser water supply.

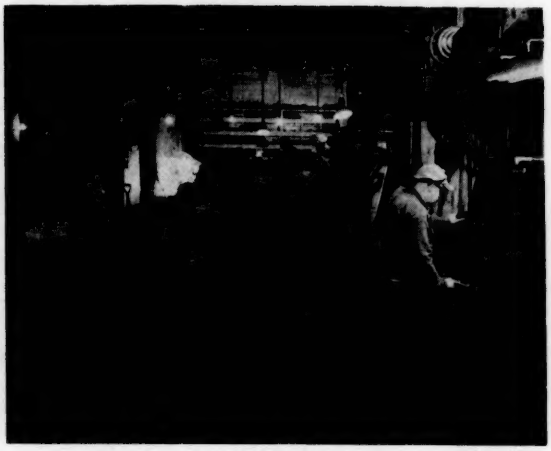


Fig. 4 — Machine tools and adequate shop space are essential to the efficient maintenance crew. Here one mechanic punches out bolt holes in an angle bar while the welder fabricates another part for the same operation. At right, maintenance foreman checks carriage travel chart on lathe before setting up. In the background the electrician foreman works over some units while a member of his gang drills out a part.

this nature will promote cooperation on their part. A list of parts that will be required for the overhaul or for replacement of these items used in the overhaul should be submitted to the purchasing department and their urgency explained.

Fig. 3 shows a typical conference between warehousing operations, engineering and purchasing departments in a major cold storage activity. Each department had a part to play in the annual overhaul of the two major compressors of this firm. The operating department determines from sales contracts or committments which specific month would be slack as far as in and out handling of product was concerned and anticipated freezing activities. Engineering knew that the compressors were due for an overhaul and that the month of the year chosen was nearest the low ebb of business activities for his company. Purchasing went to work on the list of spare parts and obtained quotations on some outside shop work which was necessary.

Down in the engine room once again, the engineer became a salesman with his own personnel, persuading them that vacations or time off was out of the question during the overhaul period and instructing various personnel as to what was expected of them. Having lined up outside shop help with purchasing, certain engineering personnel like the electrician and machinist's foreman were told how they could cooperate and supervise to a certain extent the outside shops. Spare parts were broken out and made ready and a list of the overhaul projects were handed to key personnel. Some detailed instructions were even drawn up. Critical machinery was listed first.

Provide Adequate Shop Space

Both for the annual overhaul period and regular maintenance schedules, certain shop or work space is a must. In buildings where space earns dollars in income, it is often quite difficult to convince management that such work space is necessary. A survey of the work which a firm's own maintenance force could do, compared with late invoices for outside shop work, will often convince management that a maintenance shop earns more for them per hour or for production footage. That, of course, has its limitations too, but consideration should be given by management to adequate space for performing pipe work, for operating lathes and drill presses, for some fabrication and welding, for rewinding and otherwise repairing some of the small motors. Fig. 4 shows space available to the maintenance force of a Chicago cold storage warehouse.

Operating Practice Close Kin To Maintenance Program

Operating practices are perhaps capable of more detail and instruction than the maintenance factor around a refrigerating plant. And both are closely related to one another in maintaining the economic good health of the enterprise. In the preceeding paragraphs it is noted that certain operating personnel made inspections and serviced certain equipment. This then made them close cousins to the maintenance forces. Their competent and efficient operation of machinery brings that relationship even closer.

However, the operating personnel, unless they have had years of operating experience, cannot improve their operating knowledge (and indirectly the efficiency of the plant) unless some pains are taken to instruct them. The chief engineer and his operating foreman in each plant is responsible for training the operating personnel in much the same manner that the maintenance foreman and electrician foreman are responsible for their apprentices' labors. In this connection, the engineering department trains their personnel most efficiently by posting operating instructions for the machinery. Any changes or deviation should be discussed thoroughly (as shown in Fig. 5). Other engineering instruction routine such as servicing and tests should also be written up.

Engineering routine per shift can be written out or the engine room log arranged in such a way that the routine is carried out by collecting the data which must be entered. Further, the engine room log is absolutely essential and personnel should be impressed with the importance of keeping an accurate log. For example, how many operators realize that the comparison of a log sheet today with the same time last year

YES . . .

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ICE

TEMPLETS are not a new product. They've been on the market for almost a quarter of a century and are being used by thousands of ice manufacturers throughout the country with complete satisfaction.

The re-orders we receive year after year from all of the satisfied users of TEMPLETS prove conclusively that TEMPLETS themselves and the results they achieve in making better ice are unparalleled.

If you . . . as an ice manufacturer . . . have never used TEMPLETS, we would like to introduce them to you by having you try them in your own plant without any cost whatsoever to you. We know that once you have used them you will never again make ice without them.

TEMPLETS come in the form of little green tablets. There is no extra work required in using them. All you do is drop two or three tablets in each can and presto . . . you have a stronger ice cake that does not readily crack, break, or chip. You also have a clearer cake. TEMPLETS completely or partially eliminate white butts, heavy cores and cloudy veils that customers don't like. TEMPLETS leave no taste, no odor, no color.

What's more, you will find that by using TEMPLETS you can make more ice during the peak summer months in the same number of cans. TEMPLETS reduce cracking and breaking in the cakes, so you can freeze raw water at lower brine tank temperatures, use the cans more frequently, and thus produce more ice!

Send the coupon today for a trial sample . . . convince yourself of TEMPLETS quality at our expense.

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City..... State.....

Fig. 5 — Daily informal conferences and check by the chief, varying from shift to shift, keeps the operator convinced that his department head and management are interested in his performance. It assures the chief too that service and inspection watch orders are carried out promptly, competently, and are accurately logged.

Fig. 6 — Personnel relationship in the engine room family and in the entire refrigerated enterprise are improved by human interest in the individuals and the group. Used appliances pictured here (refrigerator, fan, hot plate) and the lunch room effect help improve the half-hour lunch period for a maintenance crew.

and with a log sheet several years ago will show where wear and age have reduced the efficiency of the machinery?

Machine Saved By Good Logs And Alert Engineers

Information contained in the logs often is the tip-off to an impending machinery derangement or failure. Obvious things like entries pertinent to the condenser will show that they are dirty or clogged and inspection of evaporators will show that they are logged with oil. However, it was the team work of the operating engineer and the maintenance foreman which led to the disclosure that the high pressure cylinder of the horizontal duplex 2-stage compressor was out of alignment.

The engineer noticed that he had to inspect and adjust the packing more than usual for this side of the particular machine. The maintenance forman noted and called to the chief's attention the fact that the packing had to be replaced more often than in other machines.

Tip off was the elliptical shape of the packing. A dial gauge was attached to the rod to show conclusively to the chief, maintenance foreman and engineer — the three parties involved — that the high pressure cylinder was down, as the dial gauge showed a drop on the head stroke. At the first fall down-time, the machine was dismantled and maintenance personnel realigned the machine.

Examination of previous logs and maintenance records indicated that the machine had probably been misaligned when installed. Since the present personnel were not around at the time of the installation they were unaware of this derangement until alert personnel and engineering records turned up the fact. For just such reasons as this the engineering personnel cannot be too careful about the procedure of entering fuel, water, electric KWH demand, steam consumption, etc., on each shift. Even more important to refrigerating enterprises is the entry every two hours of temperatures and pressures required by the log sheet. These entries will promote indirectly, engine room efficiency practices.

Power Conservation Practice

Practices in engine room plants around refrigerating enterprises vary with the location of the plant. One unique practice in Chicago plants is the daily shutdown. Electrical networks in the Chicago area could not possibly carry the demand brought on them from 4:30 to 7:30 p.m. daily, especially during the winter months. Therefore the local utilities have obtained permission from the state regulatory body to impose a penalty on firms utilizing peak power demands during this period of the day. This brings about the practice of a "peak power shutdown".

The procedure followed during this period is to disconnect all non-emergency power in the refrigerating plants. Cold storage plants located in this critical area are usually finished with their heavier business transactions. Refrigerating equipment is secured and the warehouse and brine system flywheel effect enables the house to hold temperatures. Average losses of a half degree per room have been noted and only under radical circumstances have any drops up to two degrees ever been logged. Although the heavier compressors, condensers, water pumps and the like are secured, the brine pumps continue to run where required or necessary.

Even practices such as this which may be considered nuisances can often be used to advantage. Most plants use it as a changeover period for alternating their standby equipment with the lead-off machinery. Quite often it is used to effect or accomplish emergency repairs or short over-hauls which would not involve more than a couple hours work. A little planning on the part of the engineering department will make such nuisance practices forced upon them, pay.

Safety Governs Performance Of Men, Machines, Systems

Safety, another principal factor in engine room practices can hardly be covered in a paper of this nature. Each piece of machinery has certain safety features about it, or demands certain safety precautions be observed in its operation. The same thing could be said about entire systems, whether electrical, refrigerating, air, materials handling, or other. Since it is the intent of these NAPRE papers to bring home to the engineering department their responsibilities in preventing equipment failures, perhaps it would be best to devote this space to a few suggestions concerning pressure vessels and machinery.

The standard safety practice for the refrigerating enterprise should be to specify and demand ASME approved vessels. In other words insist on the ASME certificate and stamp on all unfired pressure vessels to be installed in the refrigerating system. Fig. 7 is an illustration of how the ASME code will protect engineering personnel and their plant property.

In one plant where the author acquired his experience, a receiver was used which utilized a dished or concave head. Replacement of the vessel was asked immediately when taking responsibility for the plant. An ASME approved vessel was utilized using a bumped or convex head in its place.

For demonstration purposes the old vessel was cut into sections. A small fillet weld held the head to the walls of the vessel. The head which was under sheer in this arrangement instead of under tension as it would be in a ASME vessel, was easily broken away from the shell with hand pressure. Still the vessel had been in use for a number of years under pressures ranging from 70 to 140 psi.

With regard to rotating equipment, as well as to pressure vessels, the insurance underwriter of the refrigerating plant has an engineering organization which is well equipped with test and inspection equipment which should be utilized. If defects are suspected in rotating equipment which cannot be shut down at the moment, various instruments are available for detecting such defects as cracks in the fly wheel and items of similar serious nature.[2] The underwriter's staff will consider it a favor if they are called in to assist the engineering department in determining such suspected conditions. If notified in ample time they will also put in appearance during overhaul periods and cooperate in the application of their testing and inspection of the instruments.

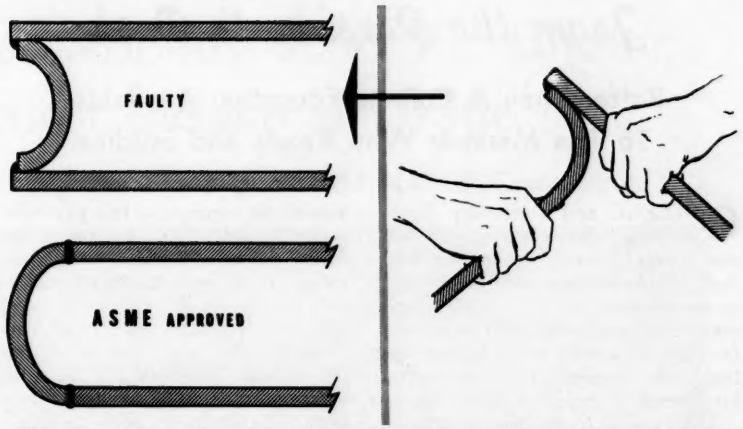

Fig. 7 — Illustration shows importance of complying with codes. Faulty design and weld can be broken by hand. Coded and inspected vessels would not permit such design and prevent its use.

[2]See "Practical Refrigeration and Insurance Service, C. D. Drane, Page 43, 1955 NAPRE Operating Data Book or Industrial Refrigeration, Sept. 1955.

Personnel factor is another item of equal importance to maintenance, operating and safety practices in the

(Continued on page 57)

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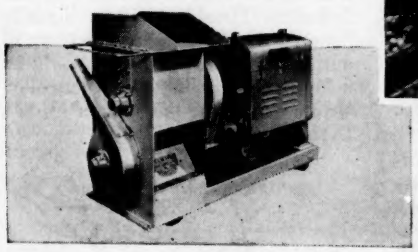
Top-icing is fast and effective

Here's extra profit for your ice service . . . helping shippers, wholesalers and warehousemen preserve perishables —in storage or en route. And a Link-Belt Ice Crusher-Slinger is your best means for getting your share.

These low-cost, efficient machines with capacities from 15 to 60 tons of crushed ice per hour . . . provide a slow-melting ice blanket that maintains correct temperature and moisture to keep perishables fresh. Link-Belt Ice Crusher-Slingers are available with gasoline engines or electric motors—in stationary or portable models. For facts, write for Book 2382 . . . or call your nearest Link-Belt office.



PORTABLE ICE CRUSHER-SLINGER can be moved anywhere for fast, low-cost icing. Here carload of celery is top-iced at a packing plant loading platform.

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ICE CRUSHER-SLINGERS
14,127

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

From the President's Desk

Better Than A College Education Available To The Member Who Reads and Studies

COLLEGE and University Engineering Schools condense, select and present to the engineering student the knowledge and experience of engineering ages. This is the ideal manner of acquiring theoretical and factual information to be applied by the young engineer when he enters his branch of engineering sciences.

That seems to be the advantage of sons of NAPRE members rather than the practical engineer himself. Most NAPRE members, past and present, have not had the advantage of a college education. The prospects of a present member acquiring such an education on the campus are not exactly promising, although NAPRE now has an educational loan fund to assist members with such ambitions.

The equivalent of college engineering subjects in practical experience and knowledge is available to engineers such as practical refrigerating men, through associations serving the branch of engineering in which a man is an employee. Using the NAPRE member as an example, our Association serves practical engineers in this division of the mechanical field. Like the late Professor H. G. Venemann told us so often, NAPRE and our own particular jobs give us the "Know-How".

Other societies, institutes and associations allied to the refrigerating industry have similar objectives for their members. Their literature is also available through NAPRE in many instances, which gives the NAPRE member the further opportunity of knowing or learning the "Why" behind his engineering.

Outsider Points Out Assets

Realization of the amount of material available for a practical engineering education and its importance to us doesn't usually register with the practical man. Those who make use of such data apparently take it for granted, and other members seem to be unaware of the opportunities for broadening one's education by such means. A friend recently commented on one of the NAPRE chapter reports and brought these facts home through a very simple statement.

A copy of a Seattle Chapter report had been provided by the National Office, a custom afforded to the National President. When the friend reviewed the contents of this particular report he said, "Information of this nature is equivalent to a college education. If all your chapters report as well as this on the discussion topics before their groups, and all topics are printed, it is only a matter of time before your members will have the opportunity to study similar subject matters to what they would pursue if they were enrolled in one of our engineering schools."

Come to think of it, it is a fact. How else did one of our NAPRE members become president of a national firm? And another chief engineer of four plants? One is a high school graduate and the other encountered circumstances in his lifetime which permitted only a grade school education. From NAPRE records, could be cited dozens more.

These engineers, now executives, got their practical experiences (Know-How) on the job like the college boys have to do between semesters, during summer vacations, or when they complete their undergraduate work. These very successful individuals obtained their engineering fundamentals (Why) from trade publications, college and university extension courses, from NAPRE and other engineering associations, and publications of such groups.

Chapter Reports Important

It took a statement from an outsider to alert your president to the fact that we have today in NAPRE the opportunity for us to acquire all the necessary knowledge and background to equip ourselves to move ahead in a fascinating field. It is up to each individual member to dig that information out of the various media by which it reaches us. Chapter reports are one means of learning more about refrigeration. These chapter reports have now taken on a new look in INDUSTRIAL REFRIGERATION consistent with the realization that the information contained in them is useful data to all members of the Association who are not fortunate enough to be present for a specific chapter activity.

Chapter secretaries, reporters, correspondents or other members preparing these reports take on a new importance to us also. Their attentiveness to these assignments will mean much to the edification of all members of the Association who read these columns monthly in our official organ. It is hoped that our coming convention October 29 through November 2 at Detroit will provide the opportunity for the Association to recognize, encourage and reward the efforts of these gentlemen.

Naturally, after having attracted so much attention by his report on thermometers, John Grainger, Secretary, Seattle Chapter, has won the distinction of having the best chapter report of the month. See his report in this issue.

Summertime Suggestions

Many of our NAPRE chapters are now on vacation through August. Active and Associate members on their regular business visits contact many operating and maintenance engineers who should be enrolled in our Association. All of us should point out to these prospective members the benefits to be derived; namely, the book "Basic Refrigeration" by Guy R. King, which is suitable for home study; use of the Question Box; receipt of Industrial Refrigeration, which keeps one abreast of these changing times; and the satisfaction of knowing you are associated with the nation's top-notch engineers.

Convention Plans Move Ahead

The Educational Program for the annual convention to be held at Detroit is about completed. Nationally-known speakers will cover new developments of refrigeration as applied to industry. Members should make plans now to take a short vacation after a busy season and be present to partake of the hospitality and educational program, as well as the field trips that will take us through some of the largest establishments in the United States.

To Honor Industrial Members

The Sponsoring, Sustaining and Contributing Industrial Memberships are being accepted and give promise to expanding our educational fund so the National Committee can furnish additional material to the Chapters and Members-at-Large. These Industrial Members will be signally honored at the breakfast session of our convention, which session will be held at 7:30 a.m. on Wednesday, October 31, at the Statler Hotel, Detroit.

L. Etzel

Technical Center Applies Scientific Findings To Practical Industrial Usage

A Feature Field Trip for Members and Guests At NAPRE Convention

This is General Motors Technical Center at Warren, Mich., north of Detroit, consisting of 25 buildings on a 900-acre site, with its central staff research, styling, manufacturing and engineering facilities grouped around a 22-acre artificial lake.

LEO C. GAGE

Publicity Chairman
Convention Committee, NAPRE

Timely engineering field trips as a mid-week combination social-educational diversion from the business-engineering routine, have been one of the attractive NAPRE convention features for years. The feature field trip for the 47th annual meeting to be held in Detroit will be a joint affair with the ladies — to the new, very famous and highly publicized General Motors Technical Center. Dedicated with much fanfare and international news, radio and TV coverage on May 15-16, 1956, the Center will be host to NAPRE members, their guests and their ladies on Wednesday afternoon, October 31, 1956.

THE GENERAL Motors multi-million dollar Technical Center was built with the idea that science is a source of economic energy for industry, the nation and the world. Occupying a 300-acre area, the Center includes 25 buildings ranging from gatehouses to large laboratories, office and shop buildings. It is the workshop of more than 4,000 engineers, researchers, stylists, designers,, mechanics, machinists and other specialists.

These specialists seek not only to improve today's techniques, methods and products, but also are urged to look ahead, scan new horizons and chart new courses. Generally their purpose is to use science and technology to keep GM in business years and years from now. In so doing, they insure new and better products for the American people.

On the Technical Center site, part of a larger area of more than 900 acres, are four central staff organizations — Research Staff, Engineering Staff, Styling and Process Development Section (part of Manufacturing Staff).

GM Central Staff Divisions

Broadly speaking, central staff operations at the Technical Center are organized along these general lines:

Research Staff — Develops the kind of fundamental information which may prove useful to any of the technical groups within GM. Its work encompasses metallurgy (see fig. 1), chemistry, physics and many phases of mechanical engineering. In addition, its specialized facilities and personnel are made available to GM divisions for service problems.

Engineering Staff — Concentrates on long-range development work with automotive engines, suspensions, automatic transmissions, body structures, ordance vehicles and vehicle components. It investigates special design projects beyond the research stage but not close enough to production to justify divisional development. This staff also furnishes special facilities and engineering services to various GM divisions, and also has a group working on future projects in the home appliance field, such as shown in Fig. 2.

Styling — Serves as central styling and design staff by maintaining separate studios for each of GM's automotive divisions — Chevrolet, Pontiac, Oldsmobile, Buick, Cadillac and GMC Truck and Coach. Other styling groups serve Frigidaire Division and other GM non-automotive divisions.

Process Development Section — Works on engineering studies and experimental exploratory projects to improve manufacturing techniques and processes that, in turn, improve plant efficiency, increase quality and lower cost of products. Process Development is one of five Manufacturing Staff sections at Technical Center, another of which is Technical Center Service Section which operates and

Fig. 1 — Equipped for virtually all types of experimental melts is this foundry operated by Metallurgical Engineering Department of General Motors Research Staff at GM Technical Center.

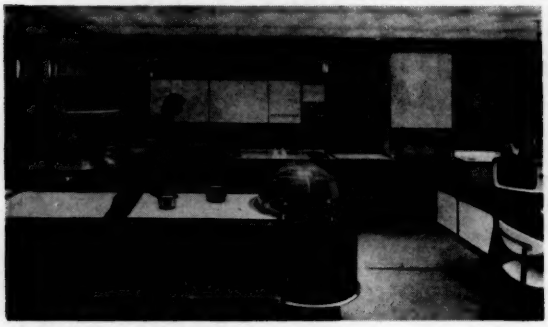

Fig. 2. — Frigidaire's Kitchen of Tomorrow is an example of cooperative efforts between the General Motors Technical Center and Frigidaire Division. Tech Center engineers and stylists, working with Frigidaire officials and technicians, designed this kitchen which has brought praise from housewives all over the nation. The 1956 Kitchen of Tomorrow features many amazing new ideas such as heating units concealed in marbletop counter, built-in scale for chopping block, a refrigerator that can be loaded by delivery man from outside the house, fabulous magic recipe maker and ultrasonic dishwasher. NAPRE feminine guests of the 47th Convention will make this scene the focal point of their visit.

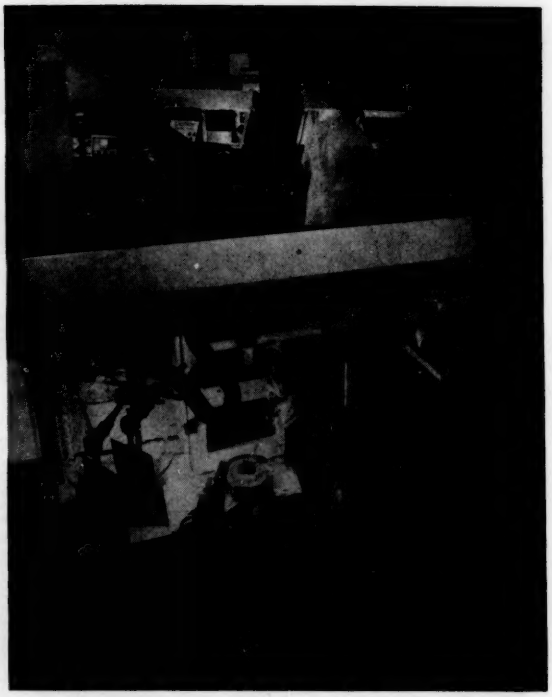

Fig. 3 (above) For work with radioactive materials, these glove boxes serve as the true laboratories in General Motors Research Staff's Isotope Laboratory. The boxes are mounted on movable carts and the exhaust air from each box is connected with the building system.

maintains facilities and services for Technical Center as a whole.

Although GM divisions conduct perhaps 90 per cent of their own engineering and research projects, their concentration is on short-range or production problems.

At the Technical Center, the emphasis is on advanced engineering and research. Engineering Staff projects generally look ahead at least three to five years; research projects extend even further into the future. Technical Center researchers and engineers also handle many programs that would be uneconomical or beyond the resources of individual divisions. A high percentage of work done by Engineering Staff, Research Staff and Process Development is initiated on request of divisions.

Styling and design of products is a consolidated activity handled exclusively at the Technical Center, although the divisions — particularly the car, truck and home appliance divisions — maintain separate studios and exercise strong powers in accepting or rejecting designs.

Site Development and Architecture

Technical Center's landscape has a campus-like atmosphere. Its buildings, none higher than three stories, have clean, functional lines of contemporary architecture, utilizing structural steel framing that emphasizes large glass areas for natural lighting. In dramatic contrast to the neutral sides are end walls of glazed brick in bright reds, blues, yellows and oranges.

Various building groups range along three sides of a 22-acre artifical lake. Dominating the skyline is a 140-foot 250,000-gallon stainless steel clad water tower supported by three columns standing in the northeast corner of the lake. An equally dramatic architectural feature at the southwestern end of the site is the aluminum sheathed Styling Auditorium with its domed ceiling 65 feet high and 188-foot span.

At the north end of the site are several special purpose structures, such as a Gas Turbines Research Building, Research Wind Tunnel and Research Isotope laboratory for work with radioactive materials (See Fig. 3).

Major Technical Center building groups are connected by more than a mile of underground tunnels. Above ground the site has approximately 11 miles of roads. Large parking zones, screened by trees and shrubbery, are situated beside each building group. Technical Center construction began in 1949. Occupancy of the first building was in 1950 and last of the major operating units — Styling — moved into its quarters in late 1955.

Insulated Panel Walls

The non-brick wall area of the buildings is of porcelain enamel met-

al panels. Only two inches thick, they have the insulating quality of 14 inches of masonry. This type of construction is another GM first. The unique yet practical construction so captured the imagination of the architectural world that the Engineering Staff building group and the Central Restaurant building won top awards of the American Institute of Architects before the project was completed.

Aside from sheer industrial beauty and efficiency, one of the primary purposes was to provide an environment lending itself to creative thinking and independent development. Everything that greets the eye has a quiet elegance together with challenging design that speaks only of the future.

The vitality expressed in design and color of the Center carries over into construction. Each building can change to meet day-to-day requirements of industrial research, engineering, or shop work where the answer requires space variations. In most buildings, for example, every office partition is movable and in one building most have been moved at least once since the structure opened. The key to this flexibility is borrowed from GM's success in automobiles — standardization with precision. One part fits where another has been. It is the knowhow of assembly lines applied to industrial construction.

Typical of this borrowing from the assembly line was the development of neoprene gasket weather seals that hold the fixed glass and porcelain enamel metal panels to their aluminum frames. All calking to that time failed to meet weather tests. Windshields on cars don't leak. They are easily installed or replaced. This logic was applied to the window sealing problem at the Center. The result: Glass and panels "Zipped" into place and sealed against weather with a filler of neoprene.

In both Styling and Research Staff buildings a new ceiling treatment with luminous plastic "pans" beneath fluorescent tubes provide shadowless lighting for stylists, designers, office workers and laboratory technicians. Designed by Styling engineers, this type of ceiling is considered a future conventional treatment for home and office lighting.

Center Serves Frigidaire

The vast new facilities of General Motors Technical Center will lend great impetus to the development of new Frigidaire products for home and business. In research and development of design ideas, Frigidaire Division has at its disposal the entire resources of General Motors, including the new Technical Center. The design of a Frigidaire product, whether it be an air conditioner, electric refrigerator, electric range or home laundry equipment, brings about constant consultation between engineers and stylists of both the division and General Motors.

The ideas and suggestions of top management of Frigidaire, including sales, engineering and production staffs, are considered before the final design is established for a product. Still another, and all important, side of the Frigidaire styling and design process is the opinion of the customer Through customer research activities, Frigidaire stylists and engineers learn what the public wants and make every effort to fulfill these desires.

While most of the styling of new Frigidaire Products is accomplished by a 53-man Frigidaire design studio, it is supported by the experience and talents of one of the largest and most successful industrial design organizations in the World — General Motors Styling. Frigidaire appliance engineers and stylists believe that the

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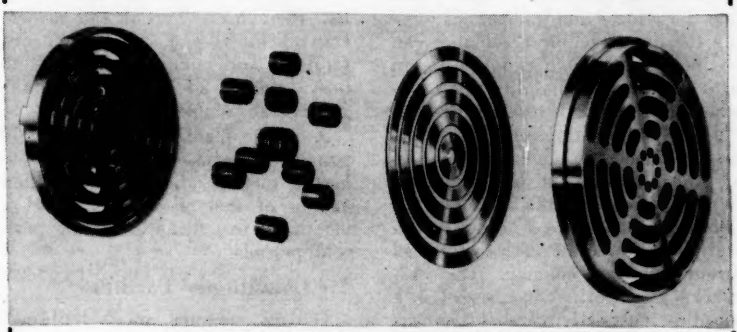

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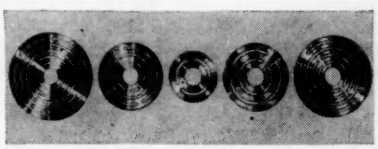

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woman's instinct for home appliances should play an important part in the styling and design of their products. Consequently, two qualified women designers hold key spots on the GM staff.

Each of the separate departments within the Frigidaire studio at the GM Technical Center work closely and continuously together in developing the design theme of the entire appliance line, and styling for each of the division's separate products (See Fig. 2). Ideas, suggestions and guidance comes from other departments of the FM Styling section, including the Styling Research department, the Interior Design and Color studio, and the Model Fabrication shops.

Other important contributions to Frigidaire's never-ending effort to give the homemaker function, beauty and styling in its products are made by the Exhibit Design and Advance Design departments. These departments deal even more in the future than do the designers of new products. New ideas and innovations passing the test of public acceptance can be incorporated into product design with far more reliability than untried and untested styling features.

In addition Frigidaire has at its disposal the knowledge and abilities of skilled men in the GM Engineering and Research staffs as well as the Corporation's active Customer Research Section and its sales personnel throughout the country. The Advanced Engineering department is a coordinating activity that screens and absorbs ideas for new features and devices applicable to the appliance field.

Here, ideas are exchanged freely and engineering applications are made available as needed. For example, consider the axial type compressor Frigidaire uses in its new automobile air conditioner. It is based on a so-called "wobble plate" principle that was first studied years ago by the GM Engineering staff in connection with a supercharger for automotive engines. In the development of a new, compact refrigeration compressor, GM Advanced Engineering and Frigidaire engineeering departments revived and refined the old "wobble plate" idea and applied it successfully to the current-day product.

Technical Center Housekeeping

General Motors Technical Center is as self-sufficient as a small city, and a staff of more than 600 men and women maintain it. There are fire and plant protection departments. A medical center is equipped like a miniature hospital. A pumping station assures adequate water and a sewage disposal plant disposes of wastes.

There are restaurants and libraries, street cleaning crews and gardeners, pipefitters and steam engineers, janitors and sign painters — all busy keeping 25 buildings and the grounds shipshape.

A power plant generates 320,000 pounds of steam an hour, enough to heat a city of 15,000. One million gallons of fuel oil are consumed a month by five furnaces during peak cold periods.

Air Conditioned Facilities

During summer most buildings are air conditioned. Each group of buildings has its own high velocity system (see table 1). The air is changed six to 15 times an hour in the various buildings. Both in summer and winter, the heating and air conditioning systems create a slightly higher air pressure inside the buildings to provide a natural flow of air and keep out dirt and dust.

In addition to the two elevated water storage tanks, there is a 1,500,000 gallon underground storage area. The water comes from Detroit city mains and is pumped to the buildings by Technical Center's pumping station. The five pumps —three for "domestic" use and two for fire — can deliver 10,500 gallons a minute.

Two sewage treatment plants are capable of treating 2,000,000 gallons of waste in a 10-hour day. The effluent water goes into open drains on which daily laboratory checks are made to certify its purification. Hauling refuse from the huge site keeps 34 men busy. They dispose of 125,000 pounds of refuse a day, excluding salvageable metal scrap. There is a fire department, complete with fire marshal, two trucks and "fire brigade" organized from maintenance employes. It responds like a village volunteer fire department.

Electricians in each group of buildings care for more than 56 miles of fluorescent tubing. There are more than 387 miles of wiring in the whole project and more than 12 miles of underfloor ducts.

For security reasons, each building group handles its own interior janitor work. Totally, janitors have more than 2,000,000 square feet of floor space to clean and wax or carpet sweep. In addition, the Center has more than a mile of connecting underground tunnels to maintain.

This overall task is handled by Technical Center Service Section, directed by Elmer Bailey. The immediate housekeeping job, excluding interiors other than service buildings, is managed by Plant Engineer Fred H. Couts. Members of Michigan Chapter No. 1, NAPRE, Detroit, on Mr. Couts' staff are James Conboy, Edw. Fylan, Donald M. Greene, Charles H. Bankert, Robert E. Cover, George H. Durie, Clayton A. Mote, and James T. Greely, Jr.

TABLE I—AIR CONDITIONING SYSTEMS AND THEIR RATED TONNAGES FOR GM TECHNICAL CENTER BUILDINGS, WARREN, MICHIGAN

Staff Organizations	Staff Buildings	Tonnage Each Unit	No. of Units
Styling	Studio & Shop	20	57
	Administration	20	14
	Auditorium	20	12
Research	Administration	20	60
	Cold Test Lab.	500	3
	Manufacturing (Small Offices & Metalurgy Rms)	20	8
	Metalurgy Engineering	15	2
		20	2
Engineering	Administration	20	16
	Shops	20	24
Process Development	Administration	20	12
	Shop	20	7
Service Section	Administration	20	9
	Shop Offices	20	3
		25	1
Central Restaurant Bldg.		25	1
		20	6
		15	1

NOTE: All refrigeration units employed for the air conditioning systems are Frigidaire reciprocating units with the exception of the cold test laboratory. These units are York Corporation equipment.

Canners and Freezers Form New Association

RESULTING from a merger of the Northwest Canners Association and Northwest Frozen Food Association, The Northwest Canners and Freezers Association has been formed. Norman W. Merrill, general manager of Blue Lake Packers, Salem, Ore., is the first president. This will provide the Northwest's food packing industry with a single strong service organization.

Wants Cascade Differences From Compound Explained

QUESTION NO. 1119: I have seen the terms compound system and cascade system used in connection with low temperature refrigeration. What do these terms mean and what is the difference between them?—E. J. G., Seattle, Wash.

ANSWER: The Cascade system uses two complete single stage systems except that the condenser of the low stage is the evaporator of the high stage. Two different refrigerants are used such as "Freon-13" and "Freon-22."

The compound system uses two compressors in series and only one refrigerant. Generally the refrigerant vapor leaving the low stage compressor is cooled before it enters the high stage.

The compound system is more flexible but has the disadvantage of the large size and high initial cost of the low stage compressor. — H. P. Hayes

Asks Servo-unit Explanation

QUESTION NO. 1120: What is a servo-mechanism? How does one differ from an ordinary type of control? —H.G.T., Tulsa, Okla.

ANSWER: A servomechanism is a special type of control. It consists essentially of a control device of relatively small output which feeds an amplifier. The amplifier controls a servo motor which provides the final control force which is required.

Suppose we had the problem of maintaining a certain water level in a large tank. One type of control would be a large float which would open and close the feed valve. If the feed valve is very large, it is obvious that such a control device would be awkward. We would prefer to use a smaller device to measure the water level and feed the output of this device to an electric motor which in turn would open and close the valve. The latter type of control would be called a servomechanism. — H. P. Hayes

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Can Use of Solids' Analysis Pinpoint System Troubles?

QUESTION NO. 1121: Is there any way of identifying solids filtered out of a refrigeration system? In other words, can I trace out my trouble and correct it using the solids as a clue?—M.F.F., Sacramento, Calif.

ANSWER: The Ansul Chemical Company has prepared an excellent chart reproduced below which shows the type of solid, its probable origin, and the remedy to be applied. This was published in the April, 1956 issue of *Ansul News Notes.* — H. P. Hayes

Why Do Refrigerants Differ In Their Flammable Hazard

QUESTION NO. 1122: I know that refrigerants can be ranked in terms of their explosion hazards and flammability but I am curious as to why some will burn or explode and others will not. Can you explain this in terms of any simple rule of thumb? —E.H.G., Green Bay, Wisc.

Tracing and Correcting Foreign Material Problems In Fluorinated Hydrocarbon Refrigerant Systems

TYPE OF SOLID	ORIGIN	REMEDY
1. Free Metals - Powdered iron, bronze or copper. Chips of copper. Solder.	Compressor wear or incomplete cleaning of compressor body. Chips of copper may result from sawing copper lines or raw edges broken off from flared joints. Origin of solder is obvious. Check for metallic iron with magnet. Corrosion solids do not respond.	Remove from system with filter drier or plain filter.
2. Corrosion Solids - Chlorides of iron, copper and aluminum. Occasionally fluorides of those metals.	Action of acid on these metals. Acid may result from moisture, oil breakdown, hermetic motor burn out, use of carbon tetrachloride or similar chlorinated solvents, or from heat breakdown of the refrigerant by soldering on lines containing refrigerant vapor.	Filter out solids with filter drier. Remove acid and water with proper type filter drier.
3. Metal Oxides - Iron oxide and copper oxide.	Iron oxide (iron rust) results either from allowing equipment to stand open to moist air or, most commonly, from liquid water circulating in the system along with the refrigerant. Copper oxide results from heating copper lines without passing an inert gas, such as nitrogen, through the lines.	Remove from system with good filter drier. Water must be removed along with the iron oxidation to prevent formation of more iron oxides and corrosion solids. Remove copper oxides with filter or filter drier.
4. Oil Sludges - Vary in consistency from brown oil to dry powder or tarry mass.	Result of heat in the presence of moisture and acid. May occur even if the system is dry and acid free if compression ratio is too high — substantially above 10:1.	Follow procedure in "Hermetic Motor Burn Out" bulletin. Based on flushing followed by filtration, acid removal and moisture removal. If oil is not too bad, it can be cleaned up by the proper activated alumina drier.
5. Ice in Capillary Tubes, Expansion Valves or Coils.	System contains more moisture than the refrigerant can hold in solution at the expansion valve, capillary tube or coil temperature.	Dry system with good filter below freezeup and corrosion range.
6. All Other Extraneous Solids.	Usually carelessness. Occasionally find desiccant or core sand, but this is very unusual.	Good filter or filter drier.

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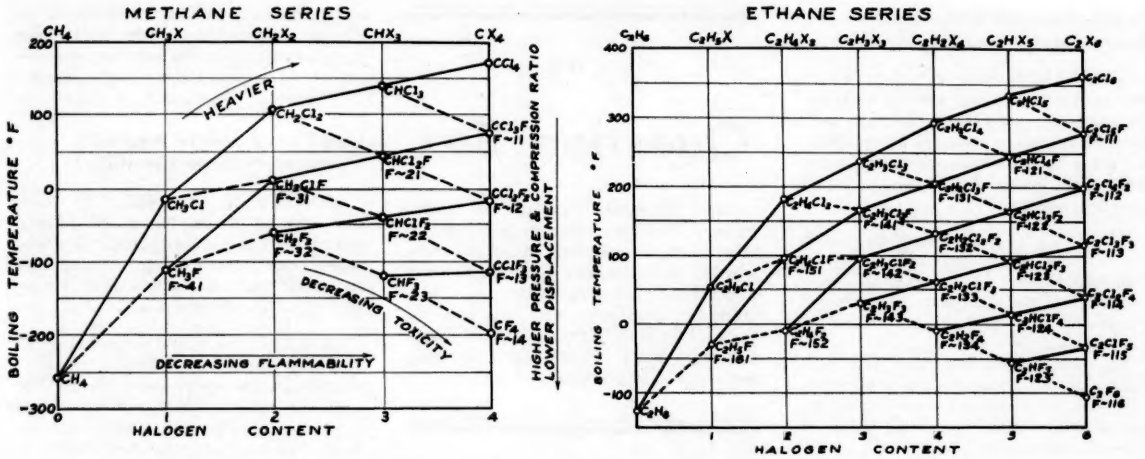


Toxic and flammable qualities of Methane and Ethane series Halogenated Refrigerants. Moving from left to right across each chart, as each hydro carbon gas has the hydrogen atoms replaced with either a Fluorine or Chlorine atom, it becomes increasingly less flammable. Data by Kinetic Chemicals Div. DuPont.

ANSWER: The general rules in estimating the relative flammability of refrigerants are:

1. Those hydrocarbons in which the hydrogen atoms have been entirely replaced by fluorine or chlorine atoms are the least flammable.

2. Those hydrocarbons in which the hydrogen atoms have only been partly replaced are moderately flammable.

3. The straight hydrocarbons are the most flammable.

See Figure above — H. P. Hayes

Air Refrigerant Qualities

QUESTION NO. 1123: If air makes a poor refrigerant to use in stationary plants why is it used in airplane refrigeration systems?—W.T. M., Sioux City, Ia.

ANSWER: Until recently air as a refrigerant for airplane cooling systems has had two big advantages—the weight and space factors. Compressed air is readily available from the supercharger of a reciprocating engine or the centrifugal compressor of a jet engine. It is thus possible to eliminate a separate compressor. Although the energy input to produce cooling is greater than it would be in a conventional system, the weight saving has generally been sufficient to offset this.

New developments in light weight conventional units may begin to replace the systems using air as the refrigerant. For example, the new Douglas DC-8 jet airliners will use an air driven turbo-compressor. Rotor for this unit is shown in the illustration below.

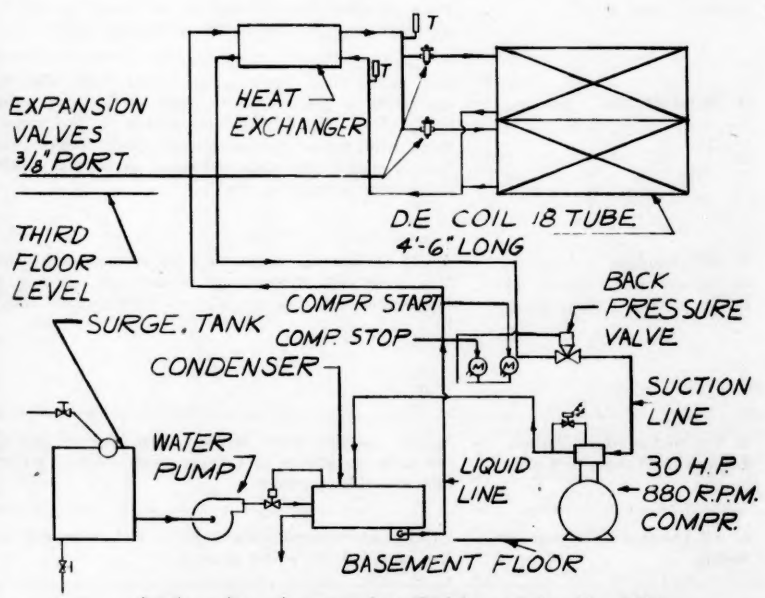
Tiny eight-lb. rotating assembly for air conditioning the Douglas DC-8 jet airliners. At the left is the turbine, driven by compressed air from the jet engine; on the other end, the compressor rotor with approximately 20 tons effect.

New Questions

Hot Basement Location Reverses Condenser—D.E. Coil Functions

QUESTION NO. 1124: We have a compressor and its associated condensing equipment located in the basement floor of our building in a pipe gallery. Since steam lines, hot water and other utility equipment is located in the immediate area, temperatures are often in excess of 90 F.

Direct expansion coils for the air conditioning system which this compressor serves are located on the 3rd floor of the building approximately 44 feet above the condensing plant. We always get rather wet gas back to our compressor and generally lose all the



Section view of system described in question No. 1124

oil out of the compressor crankcase on start-up (See Figure below):

The compressor itself is a 4-cylinder 4½" bore No. 7G6 Carrier. The refrigerant is "Freon-12". We operate at 35 pounds suction and 145 pounds head pressure. Liquid leaves the combined condenser receiver and rises to the third floor where it passes through an Acme 14-inch by 4-foot heat exchanger. It is supplied through Sporlan expansion valves with ⅜ inch ports to two American Blower Company coils. The Sporlan valves are thermo bulbs operated through an external pilot.

The direct expansion coils are 18 tube No. 86 type CH with the tube length of 4 ft. 6 inches. On the low side at the compressor a Hubbell back pressure valve is located. This is a temperature controlled, air piloted type of valve which we have by-passed at present. The compressor is equipped for 50 percent capacity reduction, also air controlled.

The operating department here would like to relocate the compressor and condenser on the 3rd floor, but meets with opposition from the engineering and building departments. It is the operating department's contention that our high condensing location and the long liquid lift allows considerable flashing to take place before the liquid ever reaches the coils. The large expansion valves also permit more liquid to enter the coils than is needed. During shut down the coils actually act as a condenser. We believe this is what results in the return of wet gas and slop-over to the compressor.

Further, the operating department contends that wet gas returning to the compressor is the cause of the oil boiling off with the refrigerant on start-up. What sort of controls would you recommend to prevent this slugging and oil wash-out?—E.W.A., St. Louis, Mo.

Confused On Terminology For Solenoid Positions

QUESTION NO. 1125: When using the terms NO and NC, would you explain whether or not the operating magnet is energized in a magnetically operated relay such as are used in switch gear and solenoid valves? L. M.E., New York.

Relief Valve Corrosion

QUESTION NO. 1126: During examination of the relief valves in our plant, all of which are piped to the exterior of the building, an amount of corrosion was found in the discharge piping and in the discharge opening of the valve itself. There is some speculation that the relief valves would be corroded shut. Has this been known to happen? How can we prevent corrosion of this nature? L.M.E., New York.

Micron Definition Requested

QUESTION NO. 1127: Articles in trade publications in recent years have been referring to impurities caught in air conditioning filters in terms of microns. What is the size of a micron? L.M.E., New York.

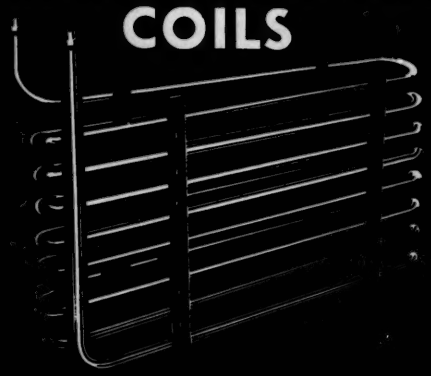
Wants Simple V-Belt Care

QUESTION NO. 1128: What are some rules of thumb for the care of compressor v-belts? M.E.Q., Boston.

Delay in Frozen Food Regulations Recommended

A ONE year delay in the adoption of state frozen food regulations has been recommended by a committee of state food and drug officials. The recommendation was part of a resolution adopted by the Committee on Canned, Processed and Frozen Foods of the Association of Food and Drug Officials of the United States. The delay will permit completion of some of the frozen food research now under way the results of which will be helpful in formulating practical regulations. Connecticut, Florida and California are among the states that already have frozen food regulations under study.—NARW Quick Sheet.

REFRIGERATION COILS



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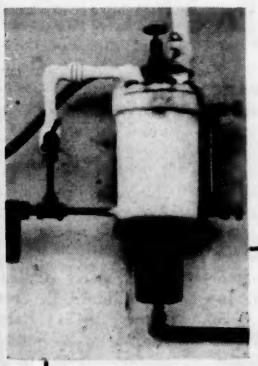

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News Notes and Chapter Activities

Honorary Membership Presented To Lawrence of Dallas

DALLAS—Joining that rare group of individuals in NAPRE known as honorary members, was J. Ed. Lawrence of the Dallas, Texas Chapter, in a presentation at his home late in March. Although the honorary membership was voted to former active member Lawrence at the 46th Convention of NAPRE in Los Angeles, it was not presented to Mr. Lawrence until late March because of his health which did not permit him to put in an appearance at the chapter meetings. It was decided that National Director Tom Weatherford should represent the chapter and present the membership certificate to Mr. Lawrence at his home.

J. Ed. Lawrence, Dallas, is presented with a honorary membership certificate by Tom Weatherford, Jr., National Director, NAPRE.

This honorary member joined NAPRE a little over a year after the association was organized in 1910. Like many NAPRE members who were employed in refrigerating machinery erection work, J. Ed. Lawrence was active as a NAPRE member when involved in work near a chapter. His years of membership then have not been consecutive, but if totaled would be quite an impressive sum of years. The honorary membership was awarded to him by NAPRE's Board of Director on a motion by the Dallas Chapter supported by other Texas delegates at the convention in 1955. Many of the Texas members credit Lawrence with the reactivation of the Dallas chapter. He had previously been a member of the Houston and Fort Worth chapter at various times in his NAPRE affiliation. He had been active in the organization of both those chapters.

Lawrence's election as honorary member brings the honorary membership role of NAPRE back to a five member level. Since the presentation of his honorary membership Mr. Lawrence has improved in health and although he has difficulty hearing, he has turned out for a couple of the Dallas Chapter affairs. — HAROLD KUTNICK

Marshall Island Member Attends Los Angeles Social

LOS ANGELES—California No. 2 Chapter, closed out its pre-summer series of meetings June 20 with a program designed to pay tribute ot the "Old Timers" of the association. The program consisted of a social period from 6 to 7 p.m., enlivened by group singing under the direction of a professional accordionist, a Swiss-steak dinner, Old Timers introduction period, and filmed entertainment.

Usual business and technical matters were side-tracked in favor of a program of music, dining and entertainment. Introduction of long-time members who qualify as "Old Timers" followed the dinner. In the lexicon of Ed. L. Nelson, master of ceremonies, to rank as an old-timer a man must have a minimum of ten consecutive years of NAPRE membership.

Flavis Register, Los Angeles Chapter's South Seas member, timed his annual vacation to the United States to take in the Old Timers Night. Register spends the rest of the year in the Marshall Islands and other far spots of the South Pacific as assistant superintendent of air conditioning and refrigeration for Holmes & Narver, Inc., Los Angeles. Back on the mainland on a 37-day leave, Register brought with him to the meeting four of the men who work under him in the Marshall Islands: Toby Cage, David McCauley, John E. Becker, and his son-in-law, Jack Wheaton.

Old-Timers Introduced

Present and introduced by Nelson were four members who qualified as 10-year men, three in the 15-year category, and eight who have held NAPRE membership for 25 years or more. Among the 25-year men introduced were: W. R. Burnett, Frank Elliot and Emmett T. Quinn (1925); William H. Brittin and Furman T. O'Hara (1926); Donald H. Byle and Nelson (1928); Rudi F. Kettler (1931); Regis Gubser (1932); and R. E. Maple (1931).

The 10 to 15-year category present included Larry H. Benedict, Alex M. Shears and Clifford P. Scott (1946); Edgar M. Marrs (1947); Ralph M. Moore (1938), and Victor A. Stubblefield (1942). Eleven past-presidents took a bow, including Nelson, Elliott, Brittin, Burnett, Gubser, Moore, Kettler, Byl, Marrs and Frank G. Muzzy, a list which, incidentally, includes two past national presidents, Quinn and Gubser.

An empty chair marked the spot in the front row which J. Wesley Lamphier had occupied at these affairs for many years. Lamphier, a charter member in 1922, passed away recently. He had not missed an Old Timers Night in the past 20 years.

The only business item that was permitted to intrude upon the pleasure program of the evening was the induction by President Clifford P. Scott of four new members. Register was called upon by Chairman Nelson to give a short talk on air conditioning and refrigeration matters in the South Pacific. Present also, as a guest of his father, Past President William H. Brittin, was Bill Brittin, Jr., a career-man in the Navy, being now in his 13th year of service. The evening's program terminated with the showing of three interesting science and sports films.

Los Angeles Chapter holds no meetings in July and August. The schedule will be resumed on September 19 with the annual Ham-and-Beans dinner. The first educational program is scheduled for October 3 in the form of a field trip to the Union Ice Company's vacuum cooling plant.— FRED HERR

Thermometer Treatise By Northwest Guest Speaker

SEATTLE—Washington Chapter No. 1 had a guest speaker on May 24, David Lee, Fairman B. Lee Co. who gave a talk on thermometers, gauges and recorders. David Lee first provided a resume on the history of the thermometer, how it came into being and its evolution. He had on display all the various models of about every type of heat recording instrument in the industrial field.

Lee said that the first thermometer was made by Galileo in 1592 to assist him in his experiments. This simply consisted of a glass bulb with a stem which he inverted into a bowl of water. On the stem were two markings. Extreme Hot and extreme Cold. The rest was guess work.

This was the only known heat recorder or heat measurement instrument until 1681 when Gene Ray, a Frenchman, took the Baro-thermo-scope, the thermometer invented by Galileo, and stood it up on end with the bulb end down and the stem upright. It too was filled with water and had two marks, greatest heat and greatest cold.

It was not until 1717 that Fahrenheit took Gene Ray's bulb and filled it with mercury. He gave it what was called the two point reference, the melting point of snow and the boiling point of water. Fahrenheit then graduated the scale in between.

Mercury thermometers will record temperatures between minus 38 degrees and plus 75 F. The variation in all mercury thermometers is from a half a degree to two degrees. Alcohol thermometers will record from minus 95 degrees to plus 150 F. The variation there is from one to two degrees. Vapor type thermometers will record from minus 300 to plus 70 F with a two to 10 degree variation in accuracy.

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David Lee demonstrated the latest in recorders. Marking is no longer done with an ink but is made by an electrical spark, so there is no need to fill the bowl or change the point. Preceeding the speaker, Bob Harrison, the chapter instructor, took the preliminary refrigeration class through Chapter 8 on Flow Equipment. The regular chapter business meeting preceeded the instruction and guest speaker. The chapter meets at Seattle's downtown YMCA.— JOHN GRAINGER.

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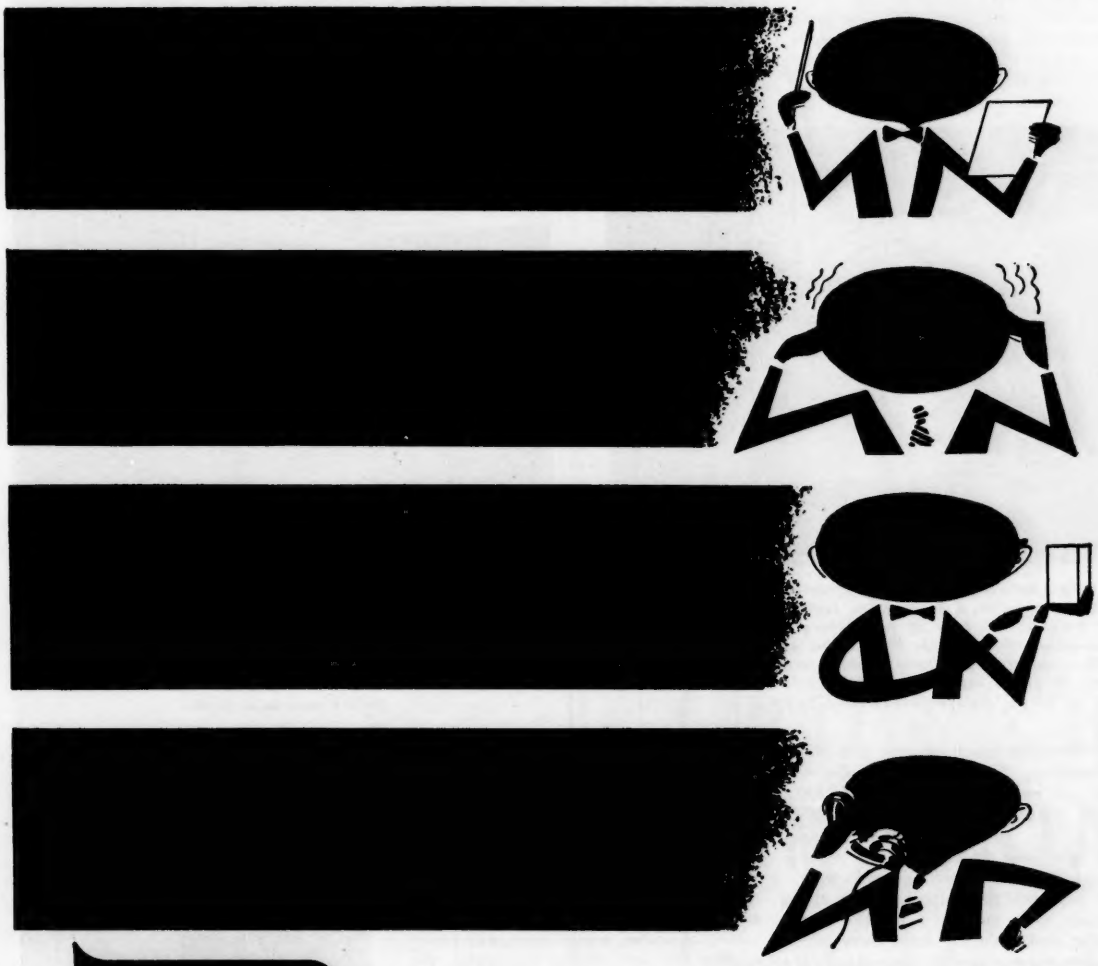

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Million Dollar Automatic Ice Manufacturing Plant Witnessed By Five State NAPRE Conferees

LARAMIE, WYO.—Denver Chapter NAPRE undertook its first regional educational conference on June 30 with a plant tour and lecture on ice harvesting. Facilities inspected were the ice manufacturing and car icing equipment of Pacific Fruit Express Co. at Laramie, Wyo. The meeting started on schedule promptly at 11:00 a.m. There were 30 men present, including Homer Whitlock, plant manager and Hubert Branham, PFE's Division Superintendent of Refrigeration, both NAPRE members, Branham being a National Director.

The men were broken up into three groups for easier handling and were started out with the initial stop at the compressor room and ice field. The first thing that strikes the eye upon entry into the engine room is the absolute spic and span floors and the well kept machinery. It is very evident that Whitlock and his superiors are people who believe and know a clean and well kept engine room is a well run and efficient one.

After marveling at the beautiful surroundings for a few minutes, the machinery starts to sink in upon the visitor's observation faculties. There are three 300-horsepower vertical single acting compressors in a line plus one-150 hp vertical. Next to that is a 100 hp vertical. Fig. 1 shows them in reverse order.

The control system of this wonderful plant is a thing of beauty to behold, particularly when it is bringing the plant back on automatic operation. Whitlock simulated a power failure so that visitors could observe this take place. Anyone who has been around synchronous motors would be amazed at the way the unloading and equalizing of the high side and low side are accomplished so that these machines may be started without manual by-passing of the discharge side of the machines. All the controls of this plant are air operated. Air is piped to individual controls from manifolds that can be used to isolate individual controls for repair or maintenance. The electric panel actuated by these air controls and containing electric switch gear for compressor, m-g sets, pumps, cranes, etc. is pictured in Fig. 2.

Fig. 1. Automatically operated by remote control, the synchronous motors pictured here drive vertical Frick compressors which produce 400 tons of ice making capacity daily at the Laramie plant of the Pacific Fruit Express Co. Denver Chapter, NAPRE, sponsored a 5-state regional conference at this plant on June 30 consisting of a plant inspector, luncheon meeting and one educational paper.

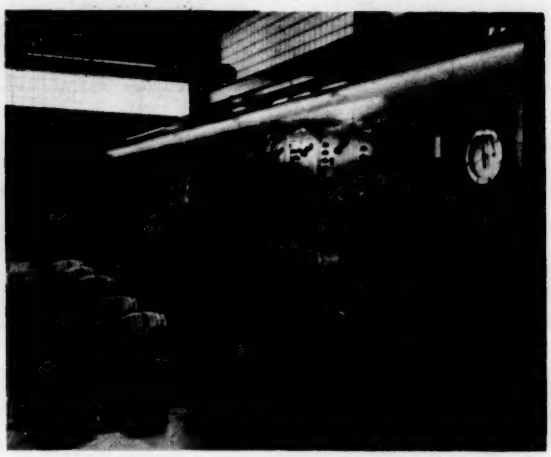

Fig. 2. Main control panel for the automatic operations of the PFE Laramie ice manufacturing facilities. At left are motor-generator sets which provide excitation for the synchronous motors pictured in Fig. 1. The panel contains starting equipment for those motors, transforming equipment, circulating pump motor starters and other apparatus utilized by this completely automatic plant.

Single Engineer Operator

Only one engineer is in attendance at this machinery. And he only works during the day, locking up the compressor room and going home at 4:30 in the afternoon. This engineer has a nice little control room where he has all the pertinent gauges and meters that show him at a glance the various pressures, temperatures, and power readings at key points throughout the plant (See Fig. 3).

It bears mentioning that there are thermostats located at all critical points of the machines, such as packing glands, cylinders, etc., to shut down the individual compressors, should any of the machines develop an excessively hot bearing, packing, rod, or piston during the hours when there isn't anyone in attendance. It is easy to see that the design engineer talked and consulted with practical people at the time that he was making up the plans for this operation. It is rare indeed when such a practical approach is used to so common a problem as this. Generally design personnel make an installation so complicated that is is entirely unworkable and has to be discarded or reworked to become operateable.

The very complexity of this plant precludes any precise description without a good deal of study at the site and some of the drawings of the piping and electrical plans. Some idea can be obtained from INDUSTRIAL REFRIGERATION articles of April 1951 and February 1953. The 1956 NAPRE Operating Data Book carries more details in a paper by R. F. McKee, Mech. Engr., PFE Co. Members and guests who toured the installation don't pretend that they understood all they saw. This is the type and size plant that one learns by degrees.

After seeing all that they could of the compressor level, visitors then went up on the ice field to watch some of the pull. Any woman would be extremely proud if she could get her floors varnished and polished to look half as good as the can covers on this ice field. This reporter doesn't by any means write with a smile; it's a fact. Any woman would be more than proud if her floors looked anywhere

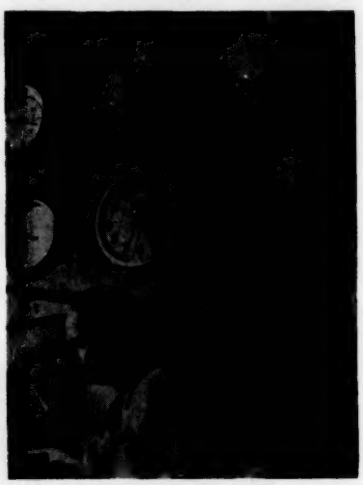

Fig. 3. Homer A. Whitlock, plant manager, checks over the engineer's figures. The watch engineer at this PFE plant works a day shift only. The plant is on its own from 4:30 p.m. to 8:00 a.m. the following day.

Fig. 4. NAPRE members and guests marveled at the cleanliness and super-finish applied to the covers over the twin ice fields at the Laramie PFE company installation, pictured here. Order and cleanliness promote safety.

Fig. 5. The crane operator here harvests 36 cans of ice at one time, amounting to more than 5 tons. Even harvest operations at this PFE plant are controlled by a program time clock which prevents premature harvesting.

near as good. Fig. 4 shows this fact to some advantage in the manner that light is reflected from the varnished and polished covers.

Witness Ice Harvest

The operator pulled some ice while members were there. All were able to get a look at some really well designed and programmed equipment. The operator pulls 36 blocks at a time, amounting to some 10,000 lbs. per pull (See Figs. 5 & 6). The operator can only pull from the finished side of the field at the appropriate time. They don't leave anything to human error. The side of the pull that is to be worked is scheduled by the programming device and if the operator should get on the crane for the wrong side he would find it inoperative. These people thought of everything. This reporter and other visitors had seen and participated in quite a bit of various type construction, repair and rebuilding jobs. It was agreed that nowhere have visitors seen more attention paid to what some designers would think as minor detail, and which most operators and practical men know to be important to good and trouble-free operation.

After getting all information they could

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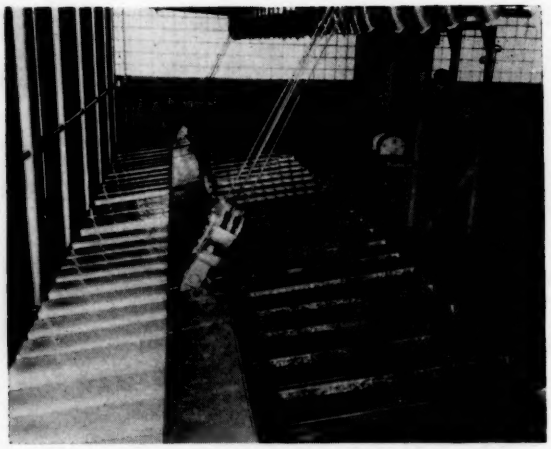

Fig. 6. Operator completes his dump. After the blocks have slipped from the cans to the conveyor, the crane rights the cans to vertical position for filling from the spigots appearing at the top of this illustration. The entire 36 cans are then replaced in the brine tank for harvesting again in less than a day.

Fig. 7. One of the many automatically controlled conveyors which transports the ice to storage and from storage to icing operations along PFE's more than 80 car double trackage. A unique type of conveyor belt is used which PFE employees claim is responsible for less breakage than they have hitherto experienced. Unattended operation is order of the day here.

out of the operator, members then were conducted to the big ice storage house, where at the time of this visit PFE had some 40,000 tons in storage, most of which will be used to help pick up the peak periods of car icing. Visitors watched the conveyors in action delivering the ice to the storage crews (Fig. 7). This is no small operation in itself. The conveyors seem to think and act on their own. No-one is anywhere around and all of a sudden the conveyors start up. It would be a little spooky, one of the members remarked, if a guy was in there by himself. Pacific Fruit Express does not use the common chain conveyor in this plant, they use belting for the large part to keep down breakage. The plant manager stated that it does that to a remarkable degree.

Upon leaving the ice-house, Conferees then went to lunch at Laramie's Diamond Horseshoe Restaurant on the main highway. Whitlock called the manager of this place and prepared a nice private dining room for the luncheon session. Attendants did a little ganging up on the Denver Chapter President and in a lightheaded moment he agreed that the chapter could and would pay for the meal. As it turned out it was well worth it because everyone enjoyed it emensely and four new members were signed up. Director Branham gave a short speech of welcome and conveyed President Leroy Etzel's regret at not being able to greet the group personally at his pride and joy, the Laramie unit. Business matters made it imperative that he be in San Francisco on the day of the meet. On behalf of the membership the Denver President thanked Branham and Whitlock for their fine reception and the group then made its way back to the PFE plant.

Natural Ice Discussions

Upon arriving back at the plant the group was shown to the locker-room that had been converted into a movie show by the application of tar paper to the windows to darken it. Denver's J. Bruce Espy proceeded to set up his projector and screen and ran off a good number of slides of (Denver) City Ice's natural ice harvest up in the Colorado Rockies. These slides drew considerable comment from not only those present who didn't know the natural ice harvesting game, but also from Homer Whitlock, who did.

Whitlock had considerable to add to Espy's talk making the affair a Bob Hope-Bing Crosby production. Part of it came about when Espy showed a slide of some of the horses used in the harvesting of ice. The horses were used to drag and saw, and for many of the heavy jobs on the ice. Whitlock mentioned that the railroad at odd times had accused him of engaging in a side line employing a production by-product and the ice.

Espy mentioned that the same thing occurred to his company at times. He also supposed that since Bro. Whitlock gathered four times as much ice, had four times as many men (four times as many town drunks cutting ice) and four times as big an ice pond, he imagined that he had probably four times as many cocktails to get rid of too. This nearly brought down the house, but no one laughed any harder than Homer Whitlock.

Espy's pictures were of a very descriptive nature, starting with the first snow removal from the ice, to the last piece being taken into the ice storage. They

Fig. 8. (left) A majority of the attendants at the Laramie regional conference, NAPRE, June 30, pose for a group photograph. Attendants came from Idaho, the Dakotas, Wyoming, Colorado and Nebraska, for this first regional conference sponsored by Denver Chapter. Fig. 9. (Center) Principal officers involved in presenting the NAPRE program on June 30 are left to right: Homer A. Whitlock, PFE plant manager; Hubert Branhum, National Director, NAPRE; Mike Bistranin, President and Marcus Florida, Secretary, Denver Chapter; and J. Bruce Espy, General Manager, City Ice Co., Denver, Colorado. Fig. 10. (right) IR readers who attended the NAPRE conference at Laramie as guests of the Denver Chapter are left to right: Ralph Williams, Rapid City, South Dakota; Lloyd and F. L. Harrison, Gregory, South Dakota; and H. B. Mike Cheakey, Rocky Ford, Colorado. Williams and the two Harrisons, together with William L. Bainum, Cheyenne, signed up as NAPRE members. Williams flew his plane the 350 miles from Rapid City to Laramie in order to attend the meeting.

showed how the ice was scored in one direction with power saws and then cross sawed in the other direction. Also illustrated was the operation where they are broken off into floats and then brought over to the channel where they were broken down into the individual cakes for feeding into the conveyor that took them to the various storage houses.

Natural Product For RR Use

One of the features that drew considerable comment was the fact that they sent these ice blocks through a planing device that planed each block to exact size so that storage was even across one row. Someone asked if the waste didn't cost quite a bit that way. Whitlock remarked that they never did shaving in their operation. Bruce Espy pointed out that City Ice's operation was quite a bit to the retail trade where it was easier to cut off different size chunks of ice for ice boxes if the blocks were uniform. He also pointed out that it didn't cost them anything to freeze the ice, so waste didn't mean much. At this point it was noted that Espy operates an artificial ice plant along with a good-sized cold storage plant. His natural ice operation is now confined to harvesting ice for the Denver, Rio Grande & Western Railroad with the Railroad themselves storing it after the Espy Co. cuts it and loads the railroad boxcars.

Meeting at Laramie, Wyo. PFE Icing Plant were Lloyd Harrison and F. L. Harrison, Gregory S. Dakota; George Carlile, Frank DiSonato, Harry Cook, Loy Stigall, George Ruther, Fred Bosiek, Al Nazarenus, Sam Wood, Raymond Herty, Byrl Walker, Alan Taylor, Carl Newman, PFE, W. L. Bramkamp, Gerald Hoekstra, Mike Bistranin, Joe Engle, Richard Engle, Eldon Werth, Roger Coldwell, Lee Emerson, Maurice Forth, Bruce Espy and Marcus Florida from Denver; H. Branham, Pocatello, Idaho; Wm. L. Bainum, Cheyenne, Wyo.; Ralph Williams, Rapid City, So. Dakota; Homer Whitlock, Laramie; H. B. Mike Cheaky, Rocky Ford, Colorado; 30 present.

Flies Own Craft To Meeting

Ralph Williams flew his own plane in from Rapid City, which shows how far a refrigeration engineer will go to learn more about his occupation. The meeting broke up in plenty of time for the trip back to Denver before dark. Joe Engle, son and friend went that-a-way fishing; George Carlile, Frank DiSonato and Marc Florida went this-a-way, almost fishless. Fisherman who stayed over for the July 1 sport had a lot of fun. They left sleeping bags in car and rented a cabin as DiSonato either don't like to rough it or has no fortitude. All would have been well but Frank got up at the crack of dawn to turn heat down and woke George up. He must be part Indian, he hit the floor and let out a war hoop, turned on lites and woke up neighbors. The only way members could calm him down was to head for the Lake. Seems as though the trout were spawning, even fishermen weren't catching any.

Denver Chapter, members-at-large and guests from the 5-state area around Laramie, have expressed special thanks to Homer Whitlock and Hubert Branham for making June 30 such a memorable occasion; for rolling out the red carpet and giving them a blue-plae tour.—MIKE BISTRANIN.

Evaporators NAPRE Talk At San Bernardino

COLTON—Evaporators was the main topic of the evening on June 13. Instructor Frank Scherer covered this chapter from the text, Basic Refrigeration, at the Santa Fe Ice Plant lunchroom, San Bernardino. With 33 percent of the members and two visitors attending, and from the attention paid to the speaker, it could be readily observed that the subject was very interesting to all present. Arrangements are now being made for the chapter's annual picnic for the month of September.

Colton NAPRE members seem to enjoy the question box best after the lunch is started. There never seem to be any questions when called for as a part of the meeting routine, but just let the members and guests start on the refreshments. The questions came out very informally then, and there's always several good answers available from all around the hall.—H. O. BONTER.

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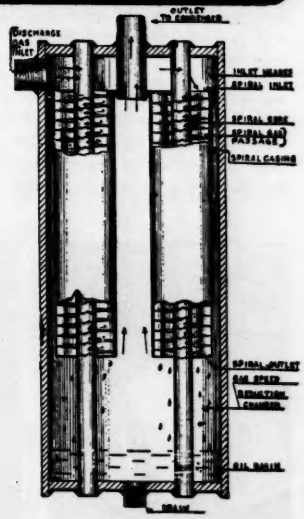

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Twin Cities NAPRE Plans Chapter Reorganization

MINNEAPOLIS—Practical Engineers in the Twin Cities of Minneapolis and St. Paul on Thursday, June 28, indicated an interest in reorganizing their NAPRE chapter which had been inactive for a year. Members in good standing, former members and prospects met with NAPRE's Vice President Bert C. McKenna and National Secretary Dick Kelahan for the purpose of planning their program calendar and organizing committees towards resumption of chapter activities in September.

Officers of the Twin Cities Chapter who had been in office when the activities in the Twin Cities came to a halt about a year ago, were given a vote of confidence by those present and will continue until their successors are duly elected and qualified. These officers are: President, Chester J. Belski, Vice-President, Herbert M. DuPaul, Secretary, Earl C. Floyd and Treasurer, George T. Gartner. Jonas Sundquist was appointed program chairman by President Belski.

National Vice-President McKenna, NAPRE, addressed the group briefly on the advantages which could be gained individually through a revived chapter effort. Vice-President McKenna pointed out that the practical engineer is fast becoming the technician. With more and more automatic equipment being introduced into the refrigerating plant, the valve twisting, gauge watching engineer is becoming a symbol of the past. Therefore, he reasons, the practical engineer has to constantly take part in activities such as the NAPRE study course, speaker program and question box within the chapters, keep pace with the times.

McKenna implemented his talk by conducting a sample question box session. A few questions were asked from the floor and various members drew on their own experiences and answered the questions. One question involved a problem which was promptly solved by referring to the Guy R. King text Basic Refrigeration. He emphasized that the question box was the basic implement for chapter activities, being the means by which all members can submit questions or problems and obtain answers for them from their local chapter brothers or from the national organization.

Other Chapters Represented

Most amazing to old Twin Cities members and prospective members was the number of visiting members from other NAPRE chapters. Frank Cordoza, past president of San Francisco chapter was present and addressed the assembly on the advantages he found in his NAPRE membership. Frank has been scheduled to visit the Twin Cities area for his firm, Foremost Dairies, Inc., and was able to tie business and NAPRE ventures together. Foremost has recently taken over two ice cream manufacturing plants in the Twin Cities area and Cordoza was responsible for the remodeling and reconstruction of these plants.

Secretary of the new Sioux City, Iowa Chapter, Bill Miller, International Representative, IUOE, also attended the Twin Cities meeting. Miller explained to those present the difficulty that his own organization had in finding suitable refrigeration and air conditioning courses which their people could follow or use to improve themselves. He stated that the NAPRE course, in his opinion, was the best. Bill described for the engineers on hand just how Sioux City chapter came about and how they had been studying the refrigeration course weekly.

Miller also explained that in the State of Iowa it was possible for their chapter to meet in a public vocational school and that between Federal and State aid they had the services of a professional instructor available to the NAPRE chapter. In other words, as a subordinate group of a not-for-profit educational association, Sioux City was able to obtain the services of a professional vocational instructor. Chapter meetings, of course, are not held on school nites, nor do business meetings infringe on the educational program.

Another visitor to the Twin Cities meeting was Robert Betschart, Vitafreeze Corp. field engineer of Sacramento, California. Fred Gallien, Carrier Corp., was present and announced that he would transfer his NAPRE membership from San Francisco chapter to the Twin Cities where he is now located. A. D. Drom of Chicago also was present and announced that he is now located in the Twin Cities and would become affiliated with the chapter there. An NAPRE member-at-large, Don Dreas, engineer with the Peter Bub Brewery at Winona, Minnesota made the hundred mile trip for the Twin Cities meeting. He indicated that it was quite possible for a chapter to be organized at LaCrosse, Wisconsin and had come to the Twin Cities meeting to learn how to go about it. He definitely left a challenge with the Twin Cities chapter to be its organized would possibly pass them up. former self or some of the new chapters

National Secretary Kelahan reviewed the national educational program, activities of the national Publication Committee and other pertinent items of national business which would be of interest to local members. He urged that as many members as could arrange it should make the trip to Detroit for the 47th Annual Convention to be held in that City October 29 through November 1. He reviewed briefly the educational and social program set for that annual meeting.

Of most importance apparently to the local members was the procedure to be followed in reinstating their membership. The National Secretary explained to those present how to reinstate their memberships if they had been suspended and how to handle new applications. Both the National Secretary and the Vice-President answered questions from the floor pertaining to the administration of the national office and the local chapter.

The meeting was held in the air-conditioned facilities of the Gartner Refrigeration and Manufacturing Co. in Minneapolis. Beverages and other refreshments were served following the meeting.—EARL FLOYD

Automation Memphis Topic

MEMPHIS—Following the refrigeration course of instruction on June 6, John Thrithart, field engineer, General Electric Co.,

(Continued on page 56)

Left: Like long-lost pals, Herb Gartner and Frank Cordoza greeted one another at the Twin Cities NAPRE meeting on June 28. Cordoza a past president of San Francisco Chapter, was one of the speakers. Center: Meeting post-mortems are a habit among chapter secretaries. Here Bill Miller, Sioux City scribe, and Earl Floyd, Twin-Cities correspondent, exchange notes during coffee 'n---. Right: Portion of the members and prospects present at the Minneapolis-St. Paul NAPRE meeting on June 28. National Vice-President Bert C. McKenna was the featured speaker. Front row occupants are: Jonas Sundquist, Instructor, Herb Gartner, Geo. Gartner, Treasurer, Twin Cities Chapter, and Dick Kelahan, Nat'l Secy.

1956 Cryogenic Engineering Conference

THE 1956 Cryogenic Engineering Conference will be held September 5, 6, and 7 in Boulder, Colorado. The second meeting of its kind in this important new field, the conference will be devoted to engineering problems in the low-temperature range, that is, below 150 K (−190 F). The first conference was held at Boulder in September 1954 as part of the dedication program of the Boulder Laboratories of the National Bureau of Standards.

The technical papers and discussions will deal with engineering research and development at very low temperatures. Among the topics to be covered are bubble chambers, instrumentation, properties of materials, insulation, and cryogenic equipment and processes.

The field of cryogenic engineering is growing rapidly, as larger and larger quantities of the liquefied gases, such as hydrogen, oxygen, nitrogen, and helium are being used by industry and national defense, and for laboratory research. This has necessitated the design and construction of safe, large, and more efficient equipment for producing and using them.

COMING CONVENTIONS

CANADIAN ASSOCIATION OF ICE INDUSTRIES
October 15-17, 1956
The Chantecler Hotel, Ste. Adele, Quebec
Mrs. Mildred Croft, Secretary

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS, INC.
October 29-November 2, 1956
Statler Hotel, Detroit, Mich.
J. R. Kelahan, Secretary

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 13-16, 1956
Atlanta Biltmore Hotel, Atlanta, Ga.
Guy W. Jacobs, Secretary

SOUTHWESTERN ICE MANUFACTURERS ASSN.
November 25-27, 1956
Adolphus Hotel, Dallas, Texas
Gen. P. A. Weatherred, Secretary

NATIONAL POWER SHOW
November 26-30, 1956
New York Coliseum, New York

DELTA STATES ICE ASSOCIATION
December 2-4, 1956
Arlington Hotel, Hot Springs, Ark.
Mrs. Edna Vaughan, Secretary

NATIONAL ASSOCIATION FROZEN FOOD PACKERS
January 6-9, 1957
Fountainbleau and Eden Roc Hotels, Miami Beach, Fla.
Lawrence S. Martin, Secretary-Manager

INTERNATIONAL HEATING AND AIR CONDITIONING EXPOSITION
February 25 - March 1, 1957
International Amphitheatre, Chicago, Ill.

AMERICAN WAREHOUSEMENS ASSOCIATION
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Secretary

NATIONAL ASSOCIATION REFRIGERATED WAREHOUSES
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Executive Vice-President

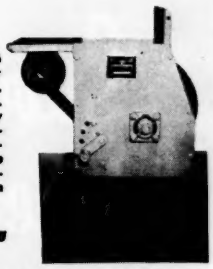
Bateman Makes Efficient Low Cost Ice Crushers For Every Purpose

Long life dependability is built into every Bateman Ice Crusher

Heavy duty Monarch model 50. Grinds 50 pound block of ice in six to ten seconds. $250.00, less motor.

Regal Model 25. For platform sacking or paper bags or general use. $160.00, less motor.

Bateman 25 CROWN. Ideal for Ice Stations . . . Vendors . . . Small Store. Only $130.00 (including 1/3 HP motor) Available with Wall Brackets or Platform Legs.

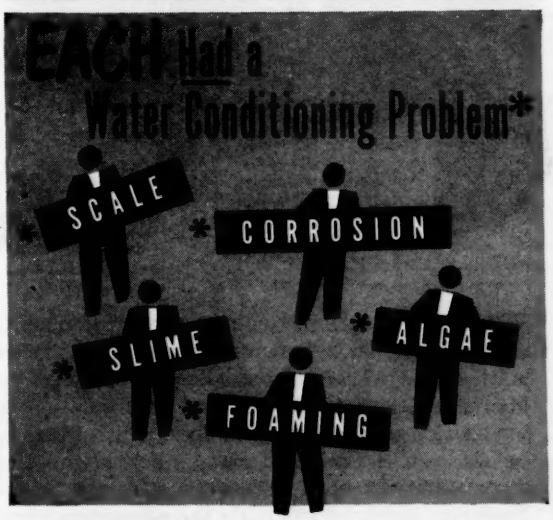


Send for Catalog — or

Write for name of your nearest dealer

Bateman Mineral Wells, Texas

Ice Processing Equipment



EACH Found the Answer at Wright!

Wright never offers a "cure-all" . . . your water conditioning problems are individually studied and analyzed by our technical staff. The answer to each problem is contained in a complete personalized report prepared especially for you. After you adopt our recommendations, constant field and laboratory checks insure proper economical performance. Write or call collect today for a complete survey of your individual water conditioning problems.

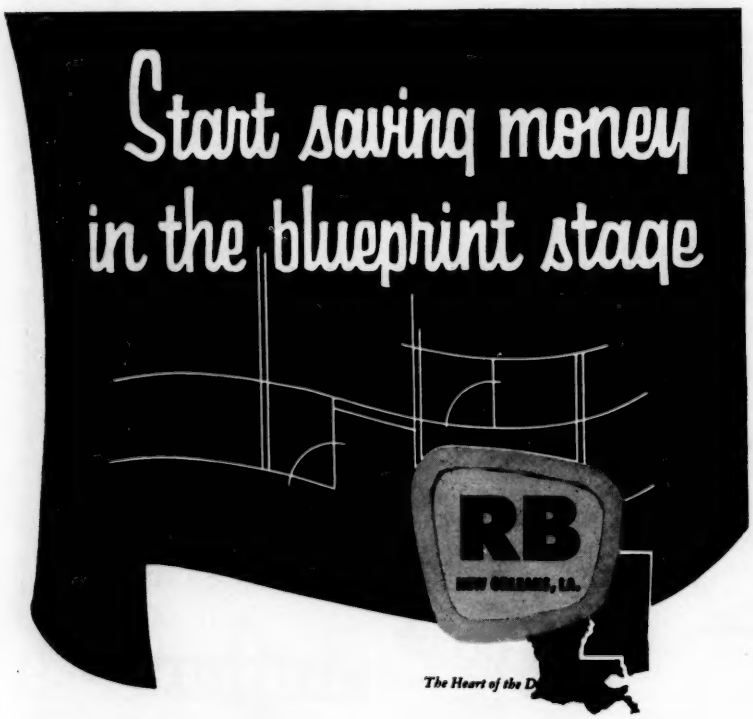
WRIGHT CHEMICAL CORPORATION
Specializing in Water Conditioning
GENERAL OFFICES AND LABORATORY
633 WEST LAKE STREET, CHICAGO 6, ILLINOIS
Offices in Principal Cities
- Softeners, Filters and other external Treating Equipment
- Nelson Chemical Proportioning Pumps

(Continued from page 54)

showed a colored sound motion picture "This is Automation." He first explained to Tennessee Chapter No. 1 members just what "Automation" means. It isn't all that the name implies! Although many things that are being manufactured today are being made fully automatic, a man stands behind them in service or maintenance. Complete operations of machining and finishing products are being done automatically. It does not seem possible that multi-step operations are completely finished and appliances delivered to consumers fully automatic in their operation. This picture is worth seeing.—CHAS. A. CONLEY.

Engineer Data Continued by Tampa Chapter

TAMPA—Engineer bulletins and publications were obtained for Tampa Chapter members during June, in addition to conducting the regular weekly educational meetings with the one monthly business meeting. After several months of effort, members of the chapter are beginning to possess an appreciable amount of reference material which not only helps in the classroom instruction on Basic Refrigera-'on, but also, and more important, it helps . iob along.



WHILE IT'S ON THE DRAWING BOARD is the time to start saving money on your new cold storage facility. Here is where the efficiency—the operating costs—of your plant are really determined. What types of insulation, what installation techniques, what operational problems must be headed off? These and many others are questions you can answer with confidence when a REILLY-BENTON insulation specialist sits in on the planning stages.

Reilly Benton company, inc.
INSULATIONS
Insulation Engineers and Contractors
2502 POYDRAS ST., NEW ORLEANS, LA.

New members enrolled recently received "Mystery of Synchronous Motors Unveiled". Local chapter members in the dairy industry were provided with "How Not To Do It In Dairies" by NAPRE's old time member and national educational committeeman C. Tom Baker. Other bulletins requested and received by the members of this chapter included bulletins by Armstrong Machine Works on humidifiers and system purgers. From the New York Air Brake Company was received the Kinney bulletin on refrigerant handling equipment, vacuum pumps for on the job evacuation of system.

One of the best pieces the chapter has yet seen on lubrication came from "Lubrication", Volume 41, No. 5, by The Texas Company, titled "Progress in the Application of Industrial Lubrication". In this article are cut-away illustrations of about every lubricating device in existence. The chapter recommends it to other NAPRE members. Materials used in construction, engineering formula and conversion factors were obtained from the Stephenson-Adamson Co. Also, bulletins were received from Zeolite, Copes Water Regulator Co., Joy Air compressor, and Allis-Chalmers, which did not deal directly with air conditioning but helped with a few other engineering problems.

In the classroom, Instructor Rhodes stressed the use of fundamentals. Since a number of our members are employed by contracting firms, and a number of operating engineers estimate their own jobs, Rhodes showed how the unit check system is made to prevent errors. Members came up with some of their own boners as illustrations.

A question came up on the transfer of energy. The instructor referred back for a short review of chapters 1 and 2 of Basic Refrigeration dealing with pressure-temperature relationships. He discussed the transfer of energy from the motor or prime mover to the gas in the compressor, showing how the compressor was the media of energy transfer.

Chapter By-Laws Adopted

Although Tampa presented a proposed set of by-laws to the national organization at the time it was under consideration for charter, final adoption of the by-laws was made at the regular June business meeting. Tampa's By-laws are patterned after those of Louisiana Chapter No. 2. at New Orleans. Our chapter differs from theirs in that we do not have three vice-presidents and some of our meeting dates and dues payable dates differ from theirs. There are other minor differences which are applicable to Tampa chapter.

Tampa has established October 1 as the fiscal year of the chapter, which coincides with the fiscal year of the national Association. However, Tampa differs from other chapters and the national in that it will collect its dues on or before October 1. No member will be carried beyond October 31, but will be instructed to take out a withdrawal card. Our chapter believes that by handling our dues along these lines that we will have less suspensions than the other chapters. By recommending a withdrawal card to a member when he is 30 days in arrears, we avoid

the risk of offending him by sending him a suspension notice later on.

Since the new by-laws provide for the election of officers and their installation coincide with the fiscal year, a nominating committee was appointed by President C. Scott Johnson to recommend a slate for the coming term.

Tampa Chapter, NAPRE, is meeting with the ASRE committee on mechanical code changes or the adoption of a refrigeration code for Tampa. The electrical code of Tampa states that each air conditioning unit shall have its own individual line. This may be of interest to other members also. Tampa chapter meets each Thursday at 7:30 p.m. in the Borden Company auditorium. Business meetings are held the last Thursday of each month. —MARTIN R. SMITH.

Kansas Reviews Merits of $CHClF_2$ to Those of CCl_2F_2

KANSAS CITY—Merits of the use of the two more popular so-called safe refrigerants was one of the principal discussion topics at the Greater Kansas City Chapter at the May 19 meeting. At the earlier May meeting and following the June meeting, discussions of advertising material in our official organ, INDUSTRIAL REFRIGERATION, and refrigerant control equipment were the principal items of discussion, respectively.

Comparative data on dichlorodifluoromethane (CCl_2F_2) and monochlorodifluoromethane ($CHClF_2$) was presented to members in attendance at the May 19 meeting by Roy McCrady, Sales Manager, Refrigeration Equipment Co. McCrady not only covered the characteristics of each refrigerant, but also presented a very interesting talk on the application of these gases in the refrigerating industry today. A number of questions were asked by the group, which McCrady handled very well. His presentation occurred in place of the chapter's regular educational course with the BASIC REFRIGERATION text, as the chapter's secretary and instructor, John Muller, was out of town.

At the earlier May meeting the chapter reviewed some of the advertisements appearing in the official organ, at the suggestion of NAPRE's national Publication Chairman, Erich B. Utescher. This discussion was held after the regular instruction period. Member Gene Preston discussed the installation at DeQueen, Arkansas, which he installed and which was pictured in the Howe Ice Machine Co. advertisement. The advertisement of Armour & Company was also discussed. Although the members detected several errors in the artist's drawing of the valve which the Armour ad depicted, it was agreed that the valve as shown was not represented to be an accurate drawing of any specific valve. As a matter of fact it had no bearing on the advertisement but it did attract attention to the ad and certainly did its job in that respect.

The regular instruction period at this meeting covered the first half of Chapter 3 of the official text. A. C. Boyd acted as the instructor and did an excellent job in covering the various refrigerants found in common use today.

Greater Kansas City Chapter has been holding its regular meetings at the Federal Cold Storage Company. The chapter is indebted to this firm for making space available to the association for meeting and instruction purposes. The chapter will not meet during the summer months. President Kenagy thanked Vice-President V. W. Crocker for pinch-hitting for him on occasions. The chapter secretary also expressed his thanks for pinch-hitting to J. L. Edwards, who acted in his behalf on several occasions. Regular meetings of the Kansas City group will commence again on September 18. To keep members in contact during July and August, a visit has been scheduled on July 17 to the Inland Cold Storage Company, a firm just outside of Kansas City here, which has its cold storage facilities in a limestone cave. On August 21 a tour has been arranged for the members to the Municipal Water and Light Plant.—JOHN MULLER.

Oklahoma Chapter Inspects Sinclair Building Plant

TULSA—Following a short meeting at Palmer Supply Company on June 5, Tulsa Chapter adjourned the business portion and went to Sinclair Oil Company's office building. The group was greeted by their engineer on duty, member Melvin Coffey, who took the visitors to the engine room on the top floor of this six story office building.

Located in the machinery room is an 800-ton centrifugal compressor using trichloromonofluoromethane (technical name for "Carrene-2", "Freon-11", or "Genetron-11"). This compressor is a component in the complete chilling unit which consists of the compressor, condenser and chiller mounted on a single frame or foundation. Cooling in offices is by chilled water circulated through blower-convectors. Two 75 hp Kewanee boilers furnish heat for hot water to complete the year-round air conditioning for one of Tulsa's newest oil company office buildings.

Some other interesting equipment in his buildings were three automatic elevators and the enormous system of electric controls operating these elevators. Also, in the building was a diagram of the earths formation which showed one oil field with six wells and the various depths to which drilling must be done to reach oil through these formations. A prospective new member, Louis I. Green, electrical engineer, Beatrice Foods Co. accompanied members on this tour. This is Tulsa Chapter's last meeting until September.—B. J. SWADLEY.

New Yorker Wants NAPRE Chapter Started

MEMBERS-AT-LARGE — Congratulations are in order for Michael Pinn, who is now associated with the Borden Company, New York City. Mike is in charge of the air conditioning and refrigeration of their 23 story office building. They have 500 tons of air conditioning equipment, one 200-ton and one 300-ton Carrier centrifugal compressors.

Pinn volunteers his assistance to any member or members in the Metropolitan New York area interested in forming a chapter. He asks that some of them get in contact with him. That area certainly has the potential engineers from which to draw, such as refrigerating and air conditioning engineers from processing plants, ice and cold storage plants, breweries, hotels, office buildings and department stores. Manufacturer's representatives selling refrigerating or air conditioning equipment make good associate members and also bolster a chapter.

Chapter Benefits Listed

Benefits of a chapter organization could be numerous. A New York group could meet semi-monthly, at which time the Guy R. King Basic Refrigeration home study course could be taught. Many of the members' problems could be aired at floor discussions. The composite knowledge of a group is normally sufficient to answer practically any member's question. If a question, however, cannot be answered by floor discussion, chapters always have the "Question Box" of the INDUSTRIAL REFRIGERATION magazine at their service. Generally it is believed NAPRE chapters promote good fellowship among engineers and produce better versed men through organized group efforts.

New Job for Member-at-Large

Another member-at-large, P. K. Sarkar, formerly located in Singapore, Malaya with the Alliance Engineering Company, as assistant engineer for the Calico Mills there, has recently returned to London. He has taken up the position of a "Theoretical Research Engineer" with Sir George Godfrey & Partners, Ltd., and is presently engaged in connection with the air conditioning problems involved in high altitude flights. This is quite a change from air conditioning in the textile industry but member Sarkar will be pleased to learn that NAPRE and its officers send him their best wishes in his new position. —FRANK CHASE.

Prevention of Refrigerating Plant Failures

(Continued from page 39)

refrigerating engine room. Personnel practices should be gauged by the description "humanitarian". Even the toughest character to be found around the engineering department responds to respect for himself as an individual human being. Every successful chief engineer that the author has been privileged to know has based his success on his ability to handle men. Interest in the man's personal welfare is a long step in promoting good human relations in the engineering department.

Personal interest in a man's training, and helping him acquire more

knowledge of his job and of the job ahead, convinces the man that his superiors and his company are interested in him. One sure way of indicating that, besides on the job supervision and training, is the encouragement of maintenance and operating personnel to take an active part in an association like NAPRE.

Management in many plants, including the author's own, have recognized the advantages and have cooperated. Being an educational organization, not-for-profit, NAPRE chapters often find it difficult to locate a meeting room, especially when they wish to use such facilities for an annual social.

Central Cold Storage Company[3] of Chicago has always welcomed the Chicago Chapter group and on many occasions assisted the national organization in making their facilities available for demonstrations. One such demonstration took place last year when a welding equipment firm of national reputation joined forces with a silver soldering and brazing operator and put on a lecture. Central made shop, engine room and other space available to set up a number of welding and brazing booths where individual NAPRE members could obtain instruction in the use of such equipment and to learn a little of the knack involved in these arts.

It is hoped that this acknowledgment and recitation will encourage other operating firms to cooperate with their local chapters. If the operating and maintenance personnel are to forego the tag of being responsible for 53 percent of the machinery failures in this industry, this bit of cooperation and encouragement from the management level will help a great deal in reducing that percentage—thus returning to management in indirect benefits.

[3]Photos used in Figs 3, 4, 5 & 7, obtained thru the cooperation of Central Cold Storage Co. Management.

Illinois Bell Telephone Installs Air Conditioning

(Continued from page 16)

equipment being used. However, the engineers are continually looking for better ways to do the job. For example, at the new Brainerd and Constance Buildings now under construction in Chicago, an entirely new type of air conditioning and heating system is being used.

Suspended acoustical ceiling throughout the buildings will serve as a radiant heating panel during the winter and a radiant cooling panel during the summer. Thus, in winter the ceiling radiates to the people in the room; and in the summer they radiate to the ceiling. A small "central" air conditioning system provides necessary ventilation to keep the air fresh and also provides a portion of the cooling effect.

However, this system needs to handle only half the quantity of air otherwise required for cooling. Smaller air handling equipment, smaller duct shafts and smaller fan rooms leave more space available for other uses. Operating with much less air, it practically eliminates those familiar drafts on "the back of the neck". In addition, this system does away with radiators and their unsightly piping on wall and floors.

Bulletins for Refrigerated Space Salesmen

(Continued from page 18)

Here are seven sound reasons which are recognized by dried fruit research people for cold storing dried fruits as part of a regular distribution program. With the emphasis in the food industry presently on sales and quality, and with the increased marketing of packaged dried fruits in this country, *more dried fruit should be cold-stored than ever before.*

Ice Warms Mine in Winter And Cools it in Summer

(Continued from page 3)

pected to be held at about 32 F as the system is improved.

When the volume of air handled through the system ultimately reaches full capacity of 750,000 cubic feet per minute, as compared to 150,000 to 300,000 c.f.m. during the past winter, upwards of 140,000 tons of ice will be formed in the stopes during each winter.

In the summer the ice will be melted as the warm fresh air passes through the stopes, and the air will be cooled between five and 10 degrees. The humidity of the air will also be reduced as it cools below the dew point and much of its moisture drops in the stopes. This phase of the Stobie air conditioning is similar to that at Inco's Creighton Mine, where fresh air being delivered to the mine is cooled by passing it through the natural refrigeration system in the old workings where seepage water freezes during the winter.

At other Inco mines where heating of fresh air is required during the winter, steam or oil installations are used. When the Stobie operation was being planned and it was noted that the logical position for the main fresh air intake lay near a low-grade section of the orebody conveniently located between the two main mining areas, the feasibility of establishing ice stopes presented itself. As a result, Stobie has been equipped with a remarkably efficient air conditioning system at a fraction of the cost of a surface heating plant.

Los Angeles Warehouse

A NEW 44,000 square-foot warehouse will be built by Consolidated Dairy Products Co., Los Angeles. The project, designed by Stiles and Robert Clements will represent an investment of one million dollars.

NEW **KRACK LOW TEMPERATURE Electric Defrost Unit Kooler** *Completely Automatic*

- Fewer defrost periods needed.
- Insulated cabinet retains, circulates heat when closed . . . speeds defrosting.
- Internally wired for easy installation.

GET NEW BULLETIN ED-1055 for details and specifications!

KRACK REFRIGERATION APPLIANCES INC

911 W. Lake St., Chicago 7, Ill.

25th Anniversary in Refrigeration & Air Conditioning

Wholesaler: United Refrigeration Supply. *Contractor:* Poletti Refrigeration Service. *User:* Liberty Cash Grocery Warehouse. Memphis, Tenn.

Booth Fisheries Profit Up

AS REPORTED by R. P. Fletcher Jr., president of Booth Fisheries Corp. earnings and sales for the fiscal year ended April 28 set new records. Sales and revenues of $43,757,000 compared with $39,566,000 in the 1955 fiscal year. Net income of $802,000 was equal to $2.54 a share on the common stock and compared with $700,000 or $2.20 a share in the year ago period.

Fletcher said public acceptance of Booth's expanded line of packaged fish and seafoods had been very gratifying. "There are," he added, "indications that additional production will be necessary if we are to keep pace with the increasing demand." Although earnings of the cold storage division declined, the quick frozen food division continued to make progress.

Ice Cream Plant Destroyed

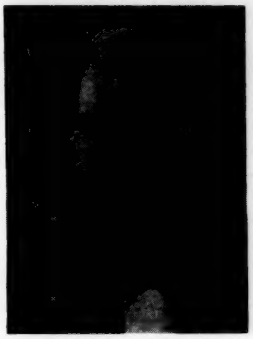
FIRE destroyed the main plant of the Stewart Ice Cream Company, Greenfield, N. Y., which operates retail stores in northeastern New York and nearby New England states. The plant is about two miles northwest of Saratoga Springs.

News of PEOPLE

Holbrook Heads Engineering For Merged Hospitals

JOHN A. HOLBROOK has been appointed administrative engineer of Chicago's recently merged Presbyterian-St. Luke's Hospital, it was announced by Ralph A. Bard, chairman of the board of trustees. Mr. Holbrook had served as assistant director of Presbyterian Hospital in charge of the physical plant since February, 1955.

A professional engineer, Mr. Holbrook formerly was senior sales engineer for the Carrier Corp., Cleveland, O. He specialized in air conditioning, refrigeration heating power wiring and automatic temperature control. During World War II, he worked on automatic flight control research.



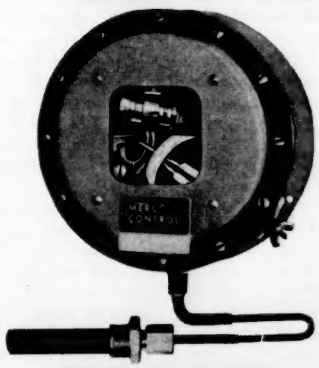
John A. Holbrook

He is a member of the National Society of Professional Engineers, the American Society of Heating and Air Conditioning Engineers, and the American Hospital Association. A native of Cedar Rapids, Iowa, he was graduated from The University of Iowa, at Iowa City, in 1936, and did graduate engineer work at Iowa State College at Ames and Northwestern University.

WILLIAM DALTON, executive vice-president of the National Association of Refrigerated Warehouses has been elected president of the Washington Trade Association Executives for 1957. Mr. Dalton was vice-president of the group in 1956.

R. E. KEISER, former manager of industrial relations and legislation activities for the National Association Refrigerated Warehouses has resigned to specialize in general contract and labor problems.

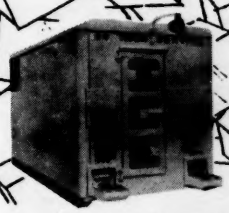
REMOTE BULB TEMPERATURE CONTROLS



OUTSIDE ADJUSTMENTS
VISIBLE ON-OFF SEALED MERCURY CONTACT
BOURDON TUBE POWER ELEMENT
VISIBLE SETTING OVER CALIBRATED DIAL

Write for Bulletin No. 16
THE MERCOID CORPORATION
4215 Belmont Avenue, Chicago 41, Illinois

PERFECT HOST
Crystal Clear
PARTY ICE CUBES



PERFECT HOST Promotion Causes COAST TO COAST Commotion!

S & S has really started something . . . soon the whole country will know . . . the only way to become a "perfect host" is to always use ice man's ice (available in almost every U. S. city, from S & S Vending Stations). Free promotion kit containing decals, newspaper mats, releases to food editors, is yours for the asking. If you want to help spark up the sales of party ice, start right now by writing S & S for full details on the big new Perfect Host promotion and on S & S Vending Stations . . . the nation's leader for 28 years.

S & S VENDING MACHINE COMPANY
670 Lincoln Avenue San Jose California

DEATHS

Samuel C. Bloom

THE death of Samuel C. Bloom, refrigeration engineer and a pioneer in refrigeration and air conditioning, occurred Monday, June 19 as a result of a heart attack near 57 East Jackson Blvd., Chicago. He was declared dead after being taken to St. Lukes Hospital. He was 67.

Mr. Bloom, well known among refrigeration engineers, was an engineer for the Federal Government. Born in Vincennes, Ind., he was a graduate of Purdue University. He began his experiments in refrigeration in 1920 and founded a company bearing his name. He developed a new method of cooling meat in packing houses, and his company installed one of the first air-conditioning units in the world in the Minneapolis (Minn.) Auditorium.

During World War II he was regional manager of the critical tools service of the War Production Board and head of the War Manpower Commission's division of manpower utilization for this area.

He was a vice-president of the American Society of Refrigerating Engineers in 1923, chairman of the Chicago Section in 1923 and 1924; and a member of the National Association Practical Refrigerating Engineers.

Louis S. Morse

THE DEATH of Louis S. Morse, prominent refrigerating engineer, New York City, occurred July 11. He was 82. Mr. Morse was associated with the York Corporation, York, Pa., for more than fifty years. He was a past president of the American Society of Refrigerating Engineers and a member of other engineering associations.

James William Dawson

THE death of James W. Dawson, owner of the Crystal Ice Company, Cortland, N.Y. occurred March 5. He was 58 years old. In 1941, with a partner he bought the Little York Ice Company and formed the Crystal Ice Company. He was part owner and manager until 1948 when he bought out the partner and became sole owner of the company. He continued as sole owner until his death.

John N. Berger

CONSULTANT John N. Berger, a 31-year member of NAPRE, California Chapter No. 2, Los Angeles, died June 27. Mr. Berger started in 1905 with York Corp. factory, York, Pa., in the engineering department, transferred to the York Los Angeles branch in 1924 as chief engineer, served as chief engineer until 1933 when he transferred to sales engineer. He occupied this position until his retirement in 1953. Upon retirement he became president of the Holtville Ice & Cold Storage Co., Holtville, Calif., and continued in this position until his death.

Frank W. Adams

THE death of Frank W. Adams, president of The Colorado Ice & Cold Storage Company occurred April 14, after a brief illness. Mr. Adams was an active member and a director of The National Association of Ice Industries and also active in the Mountain States Association of Ice Industries.

MANUFACTURERS' NEWS

Borg-Warner-York Organize Under New Merger Setup

THE organization meeting of the Supervisory Board of Directors of the *York Division* of Borg-Warner was held in the executive offices in York on Tuesday, July 3, when the following Directors and officers were elected:

Roy C. Ingersoll was elected Chairman of the Supervisory Board. Mr. Ingersoll is Chairman and chief executive officer of the Borg-Warner Corporation.

S. E. Lauer was elected President and chief executive officer of York Division.

The balance of the Board of Directors is composed of: R. S. Ingersoll, president of Borg-Warner Corporation; H. M. Haase, assistant to the president-in Charge of engineering, research and development of Borg-Warner; R. W. Murphy, vice-president and general counsel and vice-chairman of the Executive Committee of Borg-Warner; L. G. Porter, executive vice-president of Borg-Warner; Albert Steg, financial vice-president and treasurer of Borg-Warner; R. F. Lauer, vice-president in charge of engineering and research, and assistant to the president, of York; J. K. Louden, vice-president, and general manager, commercial division, of York; R. K. Serfass, vice-president and general manager, industrial division, of York; C. W. Fenninger of Philadelphia, director of Provident Trust Company, former member of York Corporation Board; William J. Meinel, chairman, Heintz Manufacturing Company, Philadelphia, former member of York Corporation Board.

Former officers of York Coroporation re-elected were: Vice-Presidents Messrs. A. C. Freimann, J. M. L. Joslin, D. M. Magor, M. G. Munce; Secretary and Treasurer, W. F. Lynne. R. H. Dowling was elected assistant vice-president to R. F. Lauer; C. A. Barnes, assistant secretary and assistant treasurer and C. W. Fenninger, Jr., assistant secretary.

The Supervisory Board then took action to confirm a new company, the York Corporation, a subsidiary of Borg-Warner, organized under the laws of the State of New Jersey and which will perform and be responsible for all factory and field sales operations for the York Division of Borg-Warner.

The same Board of Directors and officer group were elected by the York Corporation to control and administer its operations.

The remainder of the all day session was devoted to a complete orientation, for the Borg-Warner officials, of York's policies, performance records and plans with respect to distribution, engineering and research, manufacturing and financial control. This was followed by planning for the development and coordination of activities designed to quickly and fully effectuate all of the potential advantages accruing from this affiliation.

Fuller Company Acquires Lehigh Fan & Blower Co.

The Fuller Company, Catasauqua, Pa., has acquired all of the assets of Lehigh Fan & Blower Company, Allentown, Pa. This transfer included trade-marks, tradenames, and the goodwill of the business, which will be continued without interruption as the Lehigh Fan & Blower Division of Fuller Company. Lloyd J. Hersh will be actively and directly associated with the new division.

Lehigh Fan & Blower Company was founded about 36 years ago and has been continuously engaged in the engineering, manufacture, and sale of blowers, fans, and specialized equipment relating to air pollution, induced draft and high temperature applications. A. E. Douglass, President of Fuller Company, in making the announcement, stated that "Fuller Company is a large user of industrial fans and blowers in connection with its pneumatic conveying, clinker cooling, and heat recuperating equipment. It is the intention of the company to expand the business, and assign members of engineering, service, and sales staffs familiar with the industrial requirements for fans and blowers. J. A. Nicols of the Fuller Company General Conveying Division is associated with Mr. Hersh in research, design, manufacture, and sales."

New Freezer Room For Toledo Super Market

TYPICAL of the extensive construction of freezer areas now underway in the food industry is the room in the recently completed warehouse of Joseph's Super Market in Toledo, Ohio. Designed for temperatures ranging to 20 degrees below zero, the Joseph's freezer room is 140 by 40 feet and 11 feet high, one of the largest in the Toledo area with a capacity of more than one million pounds of food. Significant additions have been made, in recent years, to space allotted to these areas due to the increasing popularity of prepacked frozen foods.

Eight inch thickness of Armaglas (Fiberglas cold storage insulation manufactured by Owens-Corning Fiberglas Corporation) for sale by Armstrong Cork Company were applied in floors, ceilings and walls. Masonry surface walls were back plastered and then primed with a vapor barrier paint. Two layers (each four-inches thick) of Armaglas were then applied in hot asphalt and the inside surface was finished with Portland cement plaster.

The ceiling is a suspended 18 gauge galvanized steel deck dropped for structural members on steel rods. Two layers of Armaglas were applied in hot asphalt on this deck and connected to the wall insulation with broken joint construction. The floor insulation was applied in hot asphalt and finished with a three-inch monolithic concrete wearing floor.

The refrigeration equipment, installed by Davison Associates of Toledo, has a capacity of 30 tons. The compressor was manufactured by The Brunner Manufacturing Company of Syracuse and the Thermobank by the Kramer-Trenton Company, Trenton, N. J.

Workmen installing suspended ceiling which will serve as a steel deck where two layers of Armaglas were applied in hot asphalt and connected to the wall insulation with broken joint construction.

Armstrong Sales Engineers

SEVEN new sales engineers have been assigned to district offices of the Armstrong Cork Company's Insulation Division, according to A. E. Pearce, General Sales Manager of the division. The men joined the company in February as sales trainees and have recently completed the Insulation Division sales training course. Harland R. Caswell and Frederick F. Hauser will join the Chicago district office. Bobby R. Caudle has been assigned to Kansas City, Mo.; Bernard J. DeWolf, Detroit; Robert W. Hattemer, Pittsburgh; Donald W. Kuhn, St. Louis, and John T. O'Hara, Philadelphia.

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Bell New Sales Manager Commercial Division

Robert D. Bell

THE promotion of Robert D. Bell to sales manager of the Commercial Division, which handles the sale of the Mil-Keeper Bulk Farm Cooling Tanks, is announced by J. L. Brazee, vice-president of The Creamery Package Mfg. Co. Chicago. In between serving with the U.S. Army in Europe and a second hitch in Korea, where he received the Silver and Bronze Stars, Mr. Bell earned a degree in Chemical Engineering at the University of Illinois and later was sales manager of Graham-Bell, Inc. (dealer-merchandisers). Before joining Creamery Package, he was a Project Engineer for the Department of Defense, U.S. Government. Mr. Bell started with Creamery Package as a Sales Engineer and in June 1955 was made assistant sales manager of the Commercial Division.

Watts Joins Sporlan

Floyd B. Watts

FLOYD B. WATTS, of Dallas, has joined Sporlan Valve Company's field sales organization, it was announced by that company. Mr. Watts studied engineering at Purdue and has extensive practical experience in air conditioning and refrigeration, having worked for a large installation firm in Dallas as control engineer. For the present, he will work with J. J. Mays out of Sporlan's Dallas Office in order to expand coverage in the Texas, Oklahoma, Arkansas, and Louisiana area.

DuPont Adjusts Western Prices on "Freon"

TANK-TRUCK and tank-car prices of the most widely used "Freon" propellents and refrigerants have been reduced by Du Pont in the seven western states. The reduction is seven-tenths of a cent per pound. New prices, effective with shipments on May 26, make the bulk price of "Freon-12" dichlorodifluoromethane 26.4 cents per pound, and "Freon-11" trichloromonofluoromethane, 22.4 cents per pound. Both prices are f.o.b. East Chicago, Indiana, minimum transportation allowed. The reduction also applies to all propellent solutions of "Freon-11" and "Freon-12". Tank-car price of a typical 50-50 solution is reduced to 22.1 cents per pound on shipments to Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington.

By this move, the differential between Du Pont's delivered bulk propellent prices in the seven western states and the rest of the nation is reduced from $.015 to $.008 per pound to encourage the aerosol industry to use West Coast loaders for their western requirements. Products affected by the price reduction will be manufactured, beginning in September 1956, at a new Du Pont plant nearing completion at Antioch, Calif.

Fries New Sales Manager For Henry Bower

FREDERICK W. FRIES has been appointed field sales manager of the Henry Bower Chemical Co., Philadelphia, Pa., effective June 15. Mr. Fries has had over 20 years experience in the organization.

CATALOGS AND BULLETINS

"Sampler" Displays Rubber And Plastic Compounds

A UNIQUE "sampler" of a wide variety of ARco rubber and plastic lining compounds, proven in many years of industrial use, was recently released by the engineering staff of Automotive Rubber Company, Inc. (ARco), Detroit. The "sampler" is a 3 ½ x 8 ½ inch folder carrying eleven actual specimens of rubber and elastomeric materials compounded, milled, and calendered in ARco mills. The specimens represent standard compounds used in the majority of corrosion and abrasion resistant lining work performed by ARco engineers and technicians on tanks, vessels, pipe, fittings, duct work, fans, and other equipment.

"Sampler" of ARco rubber and plastic lining compounds

ARco laboratory files carry hundreds of special rubber compounds modified to meet unusual and severe corrosive and abrasive conditions. These compounds, it is stated, now serve in the electroplating, chemical processing, food processing, petroleum refining, transportation, automotive, aircraft, and other fields and industries.

The rubber and plastics materials "sampler" represents only one phase of this company's activities. It is claimed that ARco has pioneered in the "packaged" contracting of rubber covered (lined and coated) equipment, in the "form-dipped" process of producing rubber parts; in the production of rubber insulated metal parts, and other developments.

In addition to the Detroit lining plant, laboratory and general offices, other ARco associated firms are ARco Steel Fabricators, Detroit; ARco Rubber Processors, Houston; Latex Compounders, Kalamazoo, Michigan.

Honeywell Publishes Handbook on Cooling

INFORMATION on equipment, installation and automatic controls accumulated during the "growth" years of residential air conditioning is presented in a new book, "Fundamentals of Air Conditioning Controls," published by Minneapolis-Honeywell Regulator Company. The company says the new handbook — first of its kind in the industry — fills a need that has developed due to the relative newness of air conditioning and the absence of standardization of equipment, practices, and cooling concepts.

It will be made available to air conditioning equipment manufacturers, distributors, dealers and installers as part of the firm's program of training and education to the industry, according to Dick Locke, Honeywell's air conditioning controls manager. "The book covers the field of air conditioning from basic refrigeration to today's advanced concepts and equipment for residential cooling. It includes complete sections on control applications and electrical distribution practices," Locke said.

Folder on Asbestocite

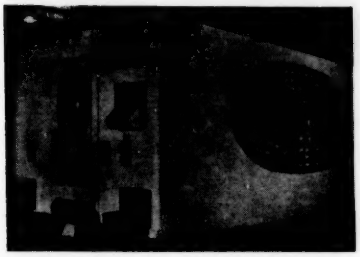
AN illustrated six-page folder "J. M. Asbestocite" has been issued by Johns-Manville. It explains how this asbestos-cement sheet material can serve industry and shows typical applications. These include the use of Asbestocite for cooling tower housings; for cold storage room facings; for a weather protection on insulated outdoor tanks; and, for the construction of fume hoods and ducts. The folder gives complete information on physical properties, sizes, thicknesses and dimensional tolerances. Also, the folder has a section on cutting, working and applying.

Booklet on Vari-Air System

A 12-PAGE, two-color booklet on its new Vari-Air System for heating, ventilating and cooling schools and public buildings has been issued by the C. A. Dunham Co. Chicago, Ill. The bulletin, No. 2181, contains selections, capacity and dimensional data, typical installations and applications.

New Trademark for Sized Ice

"YOU can't be a perfect host unless you use ice man's ice," is the theme of a new nation-wide educational campaign aimed at consumers who still use "cloudy" refrigerator ice with food and beverages. Publicity and advertising materials will be furnished to all interested ice vending machine operators by the S & S Vending Machine Company of San Jose, California. The purpose of the promotion, according to the sponsoring firm, it to create a wider market for processed ice. First efforts will be aimed at those homemakers who prepare their hot weather cold drinks with home-made ice.



The new "Perfect Host" trademark being promoted as an industry-wide name for styled ice is shown above on an ice vending station. It is a pink bulls-eye with black and white lettering.

Styled ice has gained considerably in consumer acceptance in the last 10 years, but customers are often confused by the dozen or so different names under which the product is sold in various areas. Acceptance of the "Perfect Host" name on a nation-wide basis will make it easy for a customer moving from Hoboken to Alabama, for instance, to be able to find and buy styled ice there, too.

All new S & S ice vending stations will soon bear the "Perfect Host" mark on bag ice delivery chutes. Available to all ice vending machine operators, from S & S Vending Machine Company, San Jose, Calif., is a free promotion kit containing decals, newspaper mats and press releases for local food editors. Press releases and photographs are being furnished to food editors in the Nation's 200 largest markets.

Wall Chart on Safety

A HANDY wall chart giving information on the handling and storage of ammonia cylinders and first aid suggestions for use in an emergency has been prepared by the Ammonia Division of Armour and Company. On one side of the card is printed five rules for handling cylinders, while the other side has six first aid suggestions. Ammonia users are cautioned against storing cylinders near flammable substances. In case of an accident resulting in injuries, a series of "dos and don'ts" is provided. Cards may be obtained by writing Armour and Company, Ammonia Division, 1355 W. 31st Street, Chicago 9, Ill.

Brochure on Corrosion Proofing Techniques

A NEW brochure on corrosion proofing materials and techniques containing detailed information on cement mortars, interliners for masonry construction and protective coatings and linings for surface treatment is offered by the Pennsylvania Salt Manufacturing Company's Corrosion Engineering Department.

The illustrated booklet contains sections describing the various Pennsalt materials for corrosion proof masonry construction and techniques for application, based on studies of corrosion-proof masonry installations laid up in Pennsalt cement mortars over periods of 10 to 20 years. Installations surveyed include linings in acid concentrators, stacks, pickling tanks, brick and tile floors for the food processing and chemical industries, as well as sumps, pits and trenches for handling industrial wastes. Tables and charts are provided for selecting proper cement mortars and determining resistance to various corrosive conditions.

A section on surface applications of protective coatings and linings utilizes the experience developed through a program carried out in Pennsalt's chemical manufacturing plants used as proving grounds for establishing comparative performance records under actual plant conditions. Charts are provided for general use in selecting Pennsalt coatings or linings suitable in various corrosive ranges.

Protective Coatings For Industrial Insulation

SPECIAL characteristics and advantages of "Water Base Adhesives and Protective Coatings for Industrial Insulations" are described in a new 4-page folder issued by the Industrial Products Division of the Flintkote Company, New York. The group of products includes asphalt, tar, resin and rubber base emulsions and dispersions having wide bonding and protective coating uses in air conditioning, refrigeration, sound-deadening and fields of moisture and corrosion control. It is emphasized by the manufacturer that the non-flammability of water base products is highly desirable if other factors of bonding strength and water resistance are met.

Bulletin on Condensers

A NEW Bulletin on evaporative condensers, VSC (standard) and VDF (dry-fan) has been issued by Vilter Manufacturing Company, Milwaukee, Wis. This equipment, it is claimed, offers lower operating cost with minimum space requirements. Other advantages are listed.

Magnetic Motorized Valves

A 20-PAGE catalog on magnetic and motorized valves has been issued by The Mercoid Corp., Chicago, Ill., which lists specification of these types for use with air, water, gas, steam, oil and refrigerants. Catalog also includes price list.

Classified Advertising

MAINTENANCE ENGINEER

We have an opening for a young man 30-40 years old, with degree in Engineering and with general Plant maintenance experience. Some knowledge of and experience with refrigeration systems would also be helpful. Send details of education and experience to The Stroh Brewery Company, 909 E. Elizabeth St., Detroit 26, Michigan.

USED EQUIPMENT—wanted & for sale

WANTED—Good used Flake Ice Unit, one ton capacity. Write AU-4, c/o Industrial Refrigeration.

FOR SALE — 4x4, 5x5, 10x10 Fricks, 5x5, 8x8 Yorks, splash lubrication. 7½ and 9" York crank shafts. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois, WAbash 2-3299.

FOR SALE—AMMONIA—FREON
1—3-¾x3"—8 cyl. V/W York belt driven ammonia compressor.
1—5¼"x4¼"—6 cyl. V/W York ammonia booster comp.
1—6-¾"x5"—6 cyl. V/W York booster ammonia comp.
1—25 ton Chrysler Air Temp. Freon condensing unit, complete.
1—40 ton General Electric Freon condensing unit, complete.
1—50 ton General Electric Freon condensing unit, complete.
1—50 ton Buffalo Freon evaporative condenser.
ENTERPRISE EQUIPMENT CORPORATION
79 Alexander St. Yonkers, N.Y.
Cable: ENEQCO Phone Yonkers 8-8118-9

FINNED PIPE FOR SALE—61 lengths 12' each. Made from 2" steel pipe-7" square fins 1½" apart; galvanized. New at only $3.00 per foot. Also 100 steel Hand Trucks. Medium duty; roller bearing wheels. New at $6.00 each. West Side Cold Storage Co., 7 Harrison St., New York 13, N.Y.

FOR SALE: Two 12¼x14½, 2 cylinder York ammonia compressors; one direct connected to 150 h.p., 164 r.p.m., synchronous motor with G.E. push button controller, 440V; one direct connected to 175 h.p., 180 r.p.m., synchronous motor with G.E. push button controller 440V. Machines used to make 100 tons of ice daily. Look at these machines and make offer. New Orleans Cold Storage & Warehouse Co., Ltd. 305 Gaiennie St., New Orleans 13, La.

FOR SALE
11½x10 York 200 h.p. syn. motor.
9x9 York - V-belt drive.
Two 6x6 York D-8 compressors.
Acme air cooling unit, 3 h.p.
Brine coolers, condensers, receivers, etc.
Also NEW equipment - never used:
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FOR SALE
2—10"x10" 2 cyl. Frick D.C. to 100 hp motor.
2—10"x10" 2 cyl. York D.C. to 100 hp motor.
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1—8"x8" 2 cyl. Frick D.C. to 75 hp motor.
1—7¾"x5" Frick booster.
2—50 ton G.E. Freon condensing units.
1—50 ton Buffalo Freon evap. condenser.
1—6"x6" Frick compressor.
1—5"x5" York compressor.
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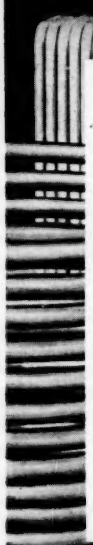

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by PAUL B. REED

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You will be surprised at the wealth of material that has been included in this convenient and practical reference Note Book. It is written in layman's language, without complicated formulas. In short, it is a tool responsible for the operation of refrigeration equipment.

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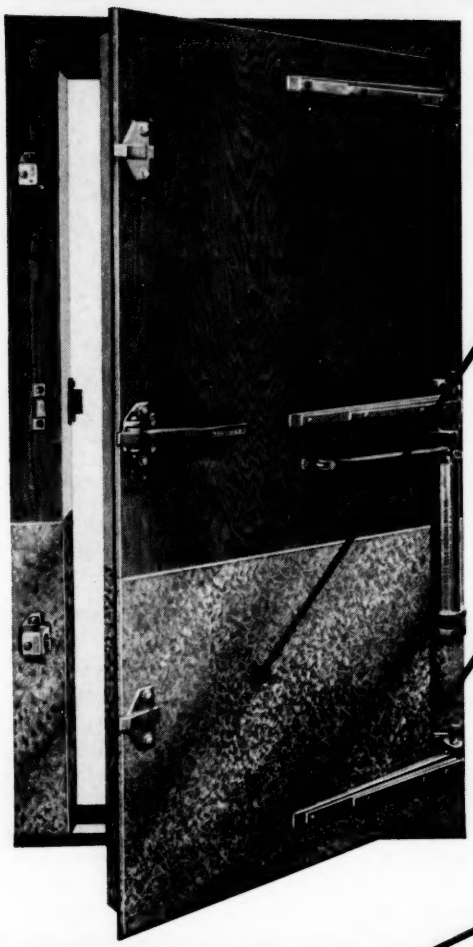

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waterproof metal boot on frame

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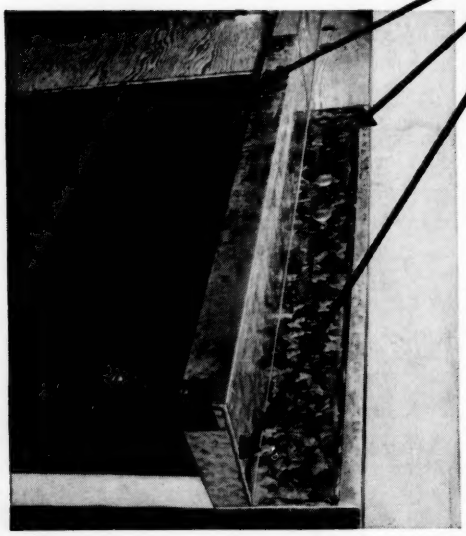
door enclosed in water-tight metal boot

frame enclosed in water-tight metal boot



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